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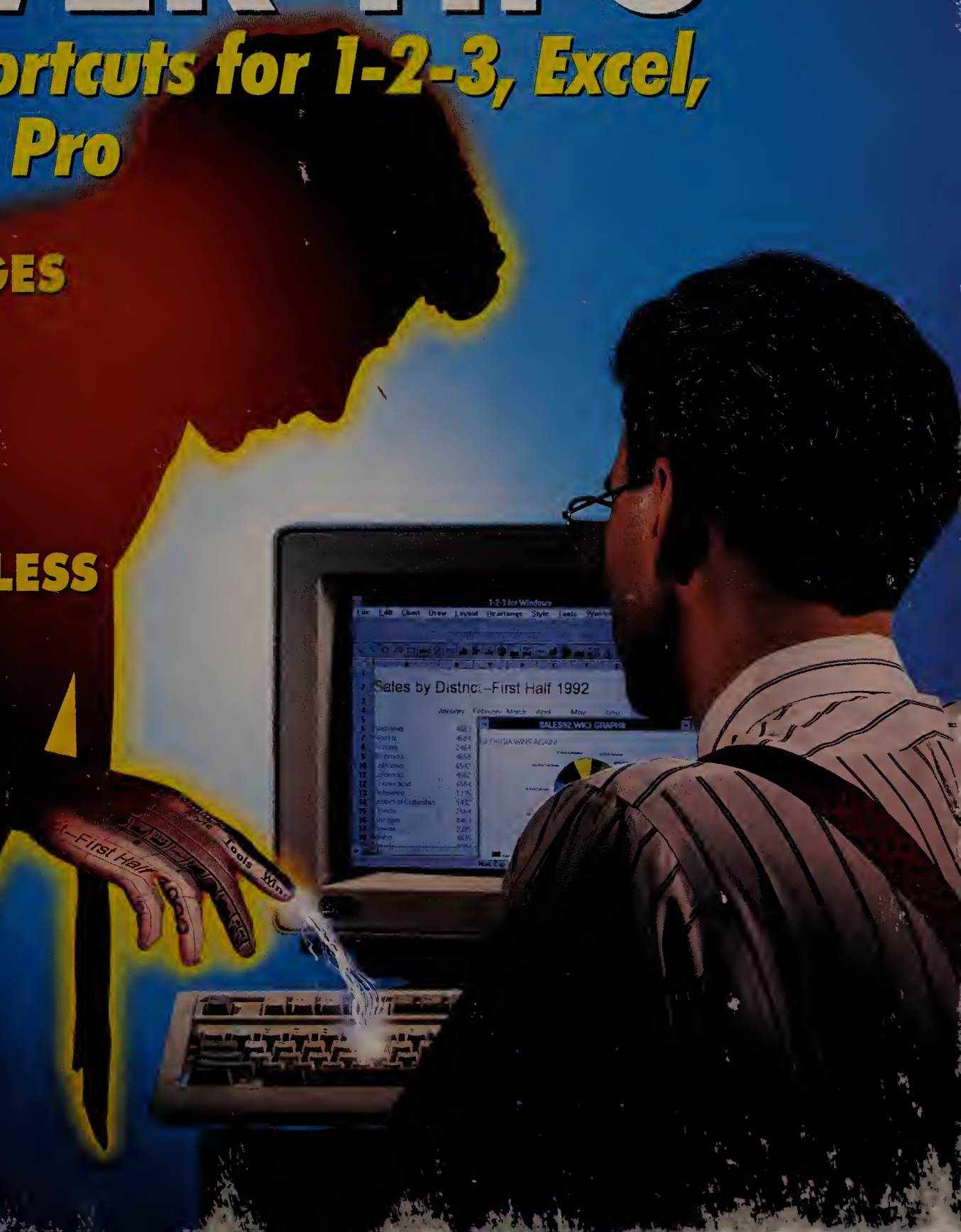

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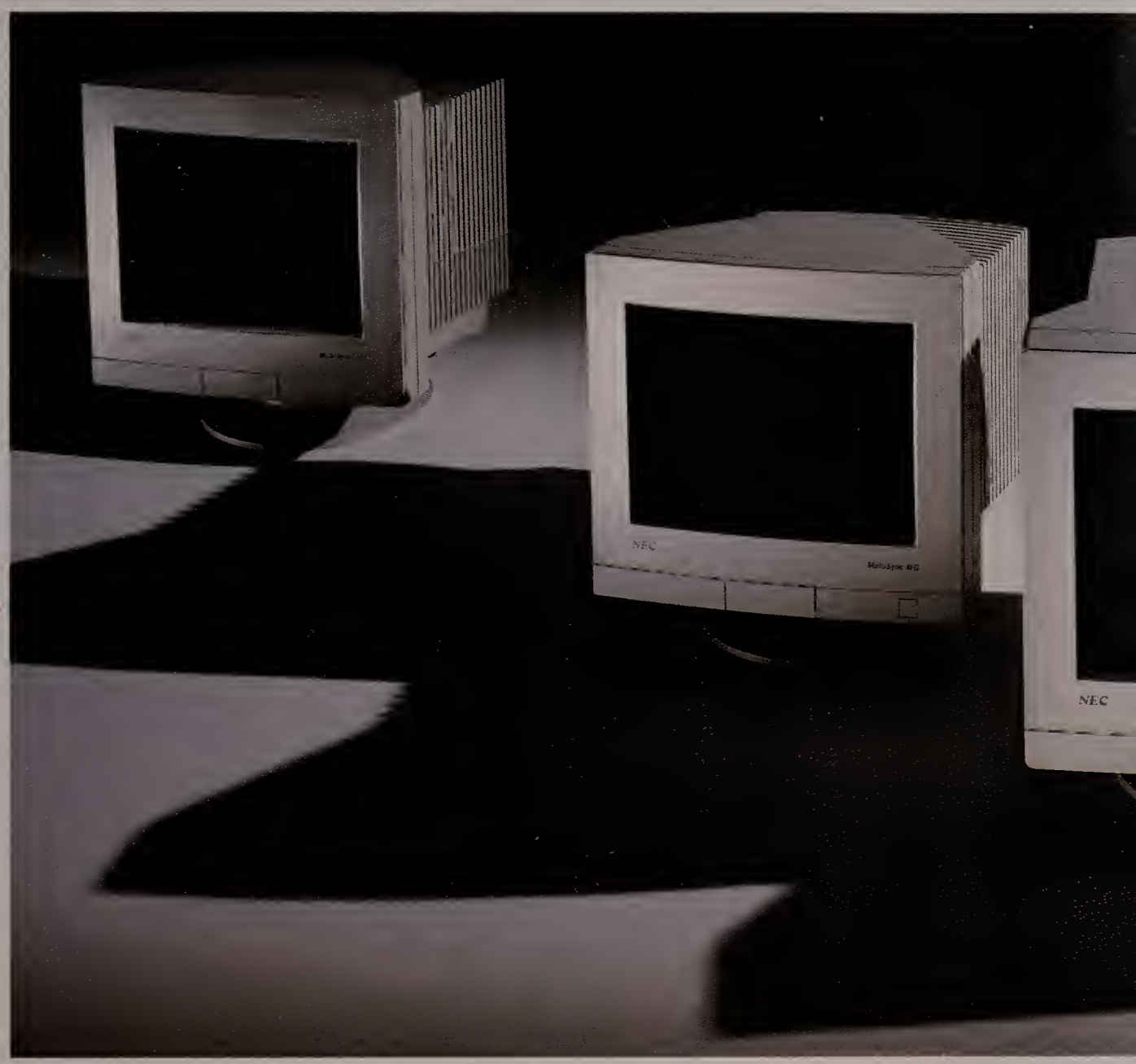

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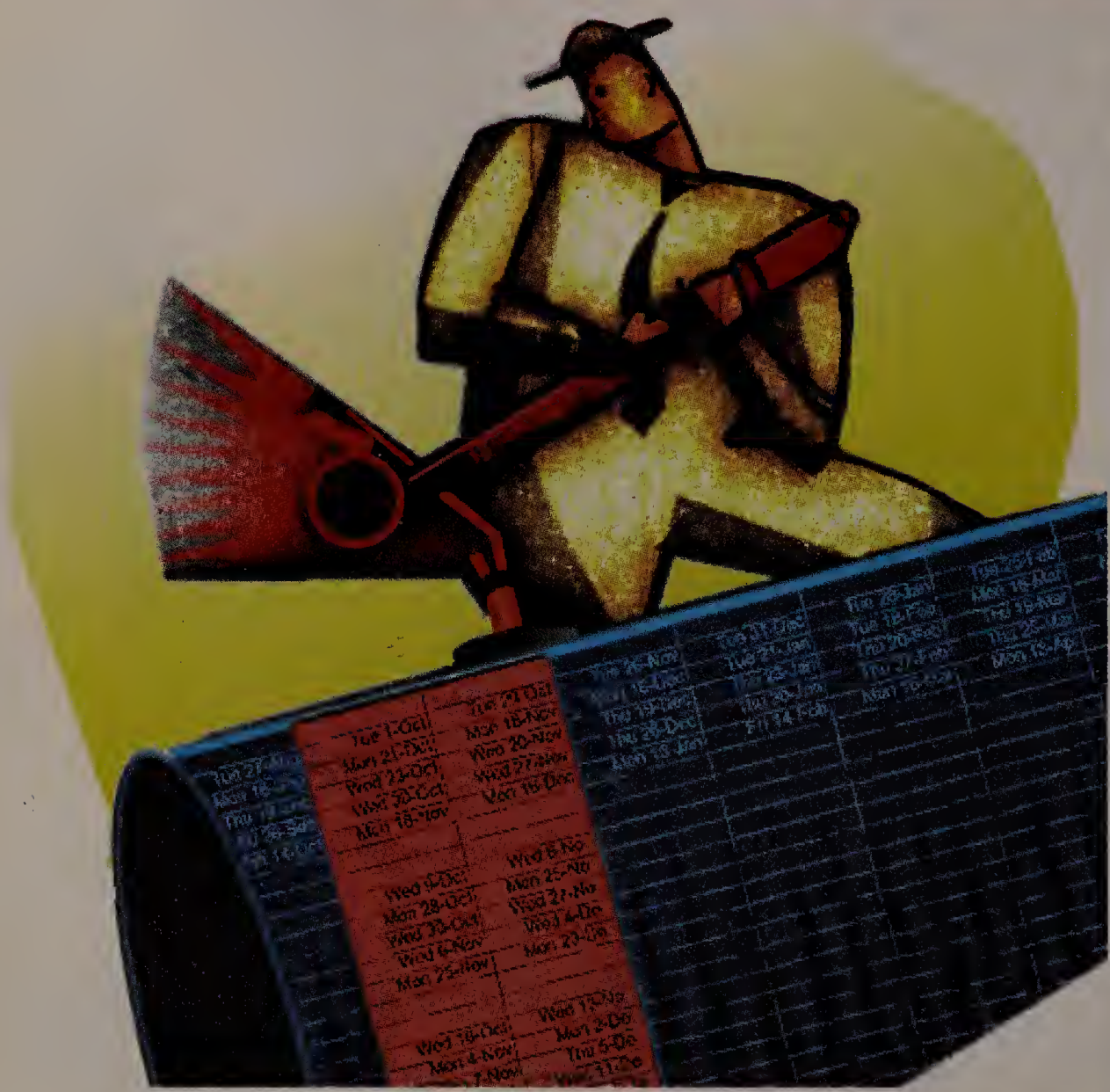
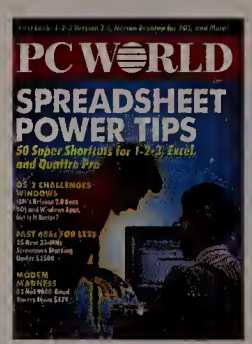


From macros to menus: Harness the power of your spreadsheet by taking a tip or two from the experts. Special bonus: tips for the new releases!

COVER STORY

50 Spreadsheet Tips

196/Can't figure out how to speed up your macros? Want to build your own icons or banish that 'Out of memory' message forever? We polled the experts—software developers, spreadsheet jockeys, staff hackers—for their secrets and shortcuts. The result? A collection of timesaving tips guaranteed to help make the most of your spreadsheet, whether it's *Quattro Pro*, *Excel*, or any flavor of *1-2-3*.



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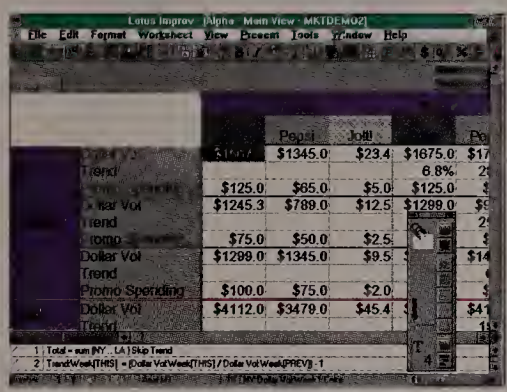

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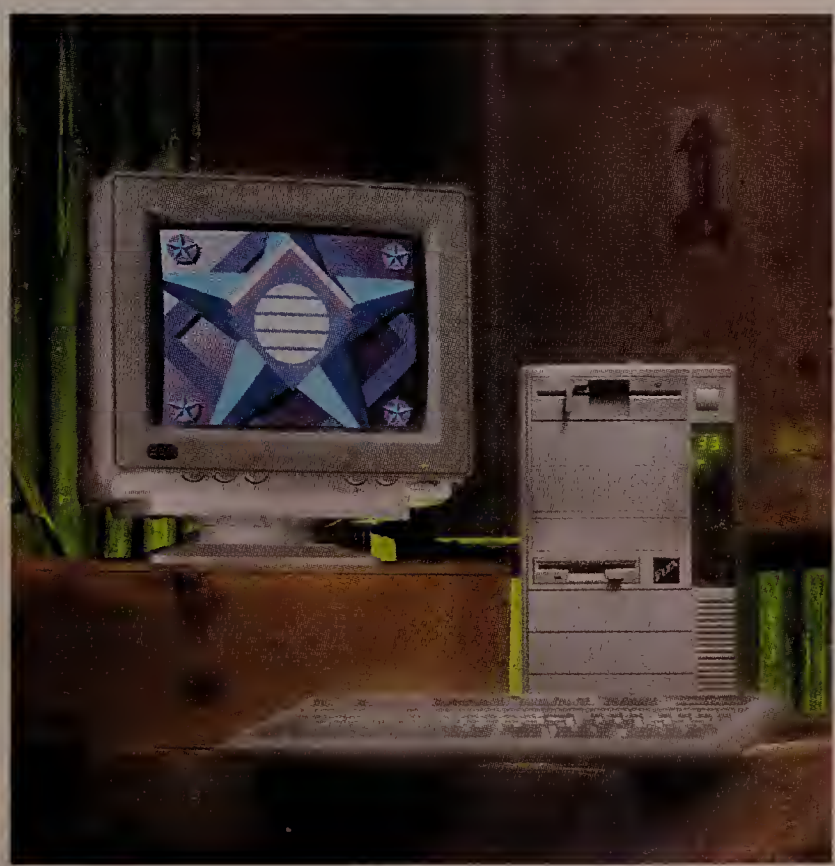

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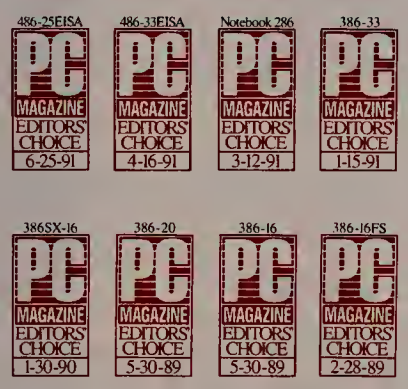

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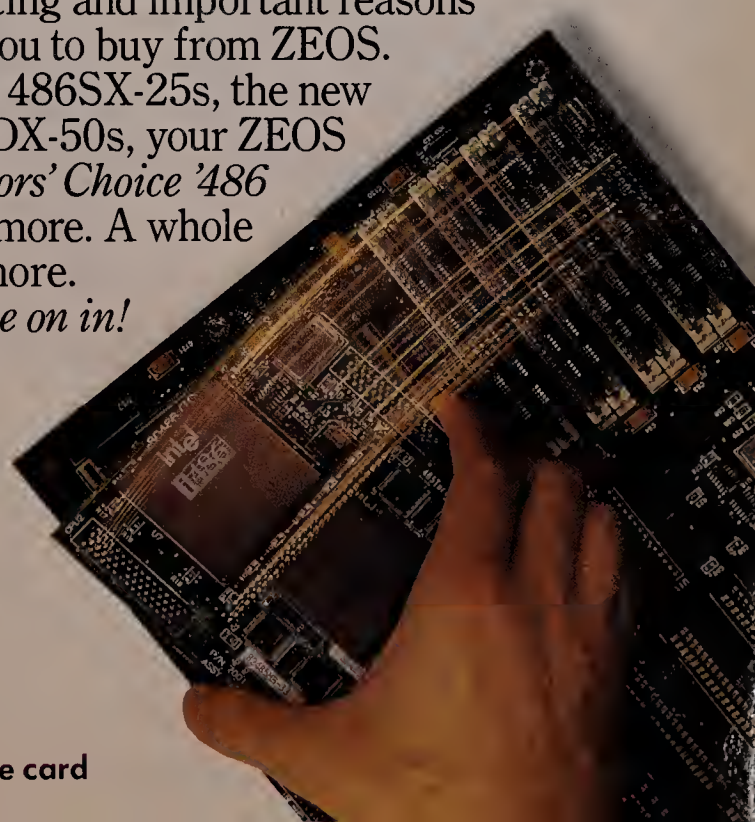

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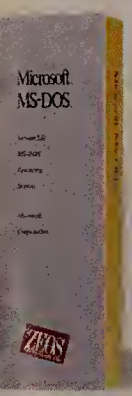

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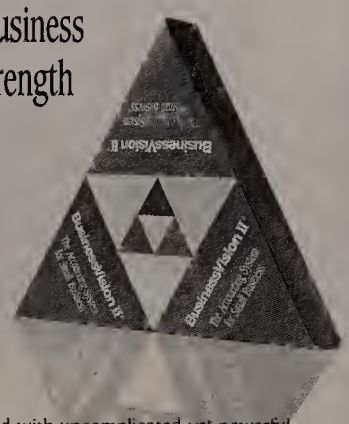

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Did Your Last Relationship End Because You Needed More Space?

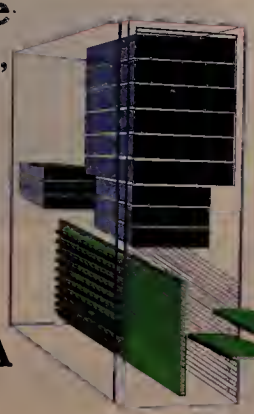
Sure, the two of you got along fine in the beginning. Then your needs changed, you wanted more... and before you knew it, you'd completely outgrown your old PC. Well, don't be discouraged, because now there's a system that won't cramp your style.

Introducing the ALR Flyer 32LCT

The **Flyer 32LCT** gives you the expandability you'd expect to find in a full-featured tower system at the type of price you'd expect to pay for a desktop PC.

Starting at.. **$2,295**

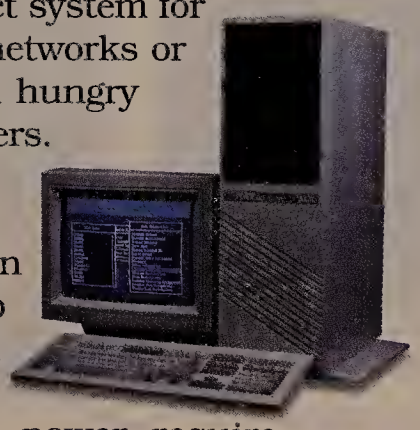
With **twelve drive bays, ten industry standard expansion slots,** built-in **Super VGA** graphics, it's the perfect system for growing networks or expansion hungry single users.



22 MIPS 50-MHz i486DX2™

14.8 MIPS 33-MHz i486DX™

11.2 MIPS 25-MHz i486SX™



The Flyer 32LCT can even keep pace with your changing power requirements. When you outgrow the Flyer 32LCT's current processor, you simply plug in a more powerful one, **Just Upgrade the CPU!**

intel inside

Model	PowerFlex FLYER	Flyer 32 DT	Flyer 32 LCT
CPU Options	i386SX/25	i486SX/20	i486SX/25
upgrades to	i486SX/20	i486SX/25	i486DX/33
		i486DX/33	i486DX2/50
		i486DX2/50	
Memory Arch.	16-bit	32-bit	32-bit
Standard RAM	1-MB	4-MB	4- or 8-MB
Maximum RAM	16-MB	64-MB	64-MB
Memory Cache	8-KB int. (i486SX only)	8-KB int.	8-KB int.
Optional Cache		256-KB	256-KB
		(Std. on DX2/50 Models)	
Expansion Slots	3 ISA	3 ISA	10 ISA
Standard HDrive	60/80-MB	0/80/120/ 200-MB	0/120/340/ 535-MB
Drive Bays	3	3	12
Starting Price	$995*	$1,495	$2,295
New 50-MHz 486DX2		**$2,495**	**$3,595**

Standard on all Models: Integrated 16-bit 512-KB Super VGA (800 x 600) upgradeable to 1-MB (1024 x 768), Serial (2), Parallel, Mouse Ports and IDE hard drive interface, 3.5" floppy drive *Price includes hard drive

The Flyer Family also consists of some very powerful, upgradeable and economical desktop systems.
The PowerFlex FLYER and Flyer 32DT...
The Flyer Family also offers two complete multimedia workstations.
The Flyer MPC and the FLYER 32 MPC...
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MIPS (IBM® Model 95 (25-MHz i486DX) rated at 8.5 MIPS) Source: Power Meter™ V.1.7 The Data Base Group, Inc. Upland, CA. ALR is a registered trademark of Advanced Logic Research, Inc. Intel Inside Logo is a trademark of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective owners. © 1992 Advanced Logic Research, Inc.

Circle 9 on reader service card

How to change a can
an open discussion.

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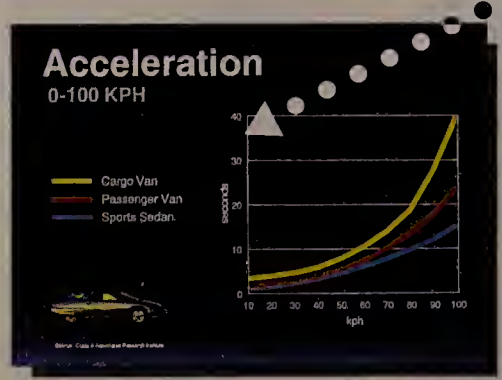
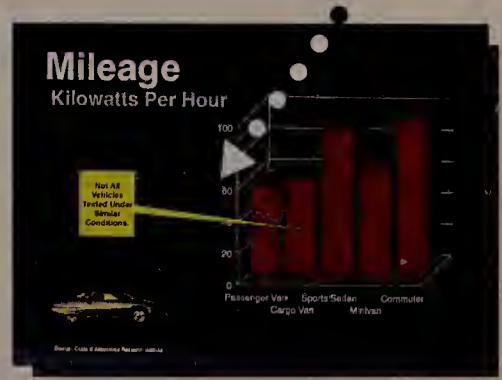
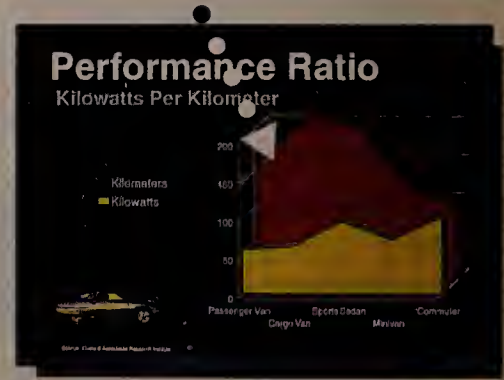
Set up simple HyperShow links between slides in your on-screen presentation.







And with the click of an on-screen button, you can jump to different slides to answer audience questions.

Make a change for the better. Call 1-800-336-8360, Operator 869, to get your

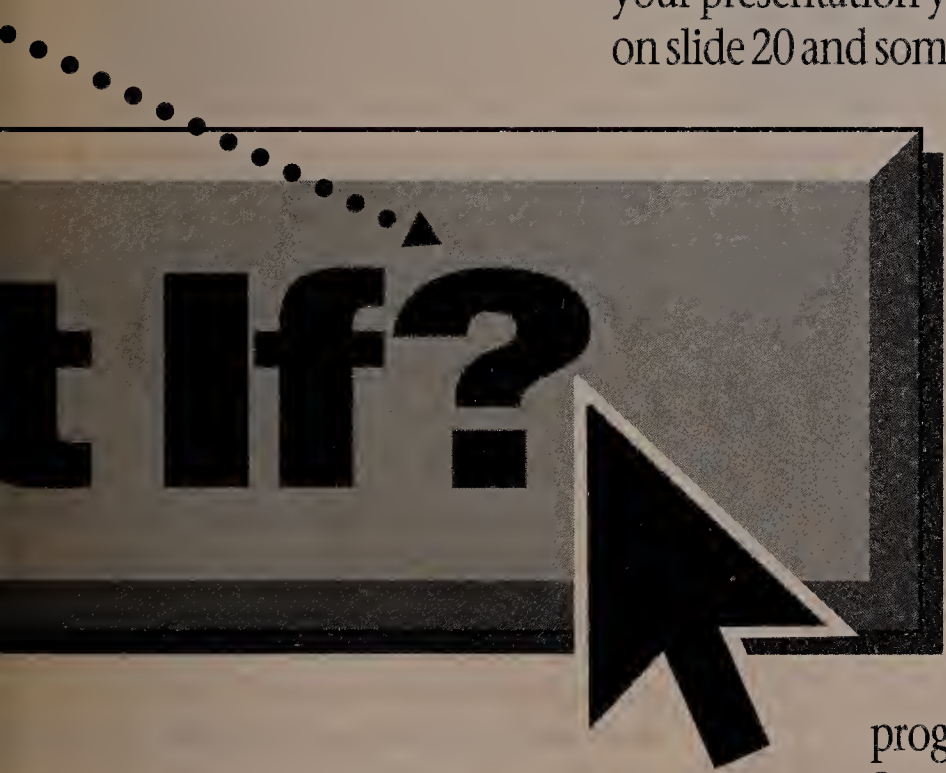
ned presentation into

Now you can change an audience that just sits there into one that sits up and takes notice.

All it takes is a PC, a monitor and the advanced ScreenShow® capabilities of Harvard Graphics® for Windows™ from Software Publishing Corporation.

And before you know it, you'll be making incredibly dynamic and interactive on-screen presentations.

Our HyperShow™ feature, for instance, lets you navigate anywhere in your presentation you and your audience want to go. Let's say you're on slide 20 and somebody asks a question that's better answered by other slides in your presentation. By simply clicking on-screen buttons, you can jump to those slides, answer the question and jump back again.



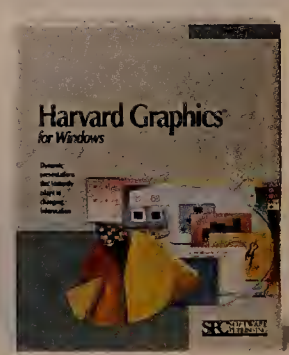
Moreover, a feature we call Launch Application lets you run other DOS and Windows programs from within your ScreenShow presentation. Everything from spreadsheets that let you play "what-if" scenarios with your audience. To sound and video that can help you make a point like you've never made one before.

And with our DDE links to other Windows programs, you can keep your data current even as your ScreenShow goes on.

Naturally, our ScreenShow capabilities include a full complement of fades, dissolves and other special effects to give your presentation a professional polish.

Harvard Graphics for Windows.

It changes everything for the better. Including the way your audience responds.



free Harvard Graphics for Windows demo disk.

SPC SOFTWARE PUBLISHING CORPORATION

Free While Quantities Last

Which data compression product?

Authorized Test Report

Software Digest®

RATINGS REPORT®

The Independent Comparative Ratings Report for Selecting IBM PC Business Software

Volume 8, Number 16

ON THE FLY COMPRESSION PROGRAMS

On the fly compression programs compress and decompress data being transferred to and from storage. This provides twice as much effective space on any given storage device.

- The overview explains the operation of these programs and focuses on data loss or data corruption. NSTL highlights inherent problems with these programs as well as glitches and bugs uncovered during testing.
- Performance testing measures compression ratios achieved on a wide variety of data files. Executables, spreadsheets, text, graphics, fonts, archives, database, and Postscript files test each program for compression ratio and speed. All performance tests run on 386SX 16MHz and 486 33MHz machines. NSTL measures the amount of conventional or upper memory block memory needed by each program.

Software Digest Rating	Overall Evaluation	Overall Power	Program Name	Version Tested	Performance	Versatility	Error Handling	Ease of Learning	Ease of Use	Memory Requirement	Price	Volume Purchase Agreements	Page
✔ ★★★★★	9.3	9.7	Stacker AT/16	2.0	■	■	■	■	■	512K	$249	✔	24
✔ ★★★★	8.6	8.6	Stacker	2.0	■	■	■	■	■	512K	$149	✔	22
★★★	7.1	6.6	Expanz! Plus	2.1	■	■	■	■	■	512K	$199	✔	20
★★	6.7	7.5	SuperStor	1.3G	■	■	■	■	■	640K	$139	✔	26
★	5.9	5.4	Double Disk	2.5	■	■	■	■	■	512K	$100	✔	18

Ratings Key (On a scale of 0 to 10)
OVERALL EVALUATIO
★★★★★ 9.0 or hig
★★★★ 8.0-8.9
★★★ 7.0-7.9
★★ 6.0-6.9
★ 5.0-5.9
ALL OTHER RATI
■ 7.0-9.5
5.0-6.
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Read what the experts have to say.

You probably *need* more disk space. Right? If you're running Windows® you *must have* more disk space. So now, the question isn't *whether* you need data compression, it's *which* data compression product? So listen to the experts.

The independent testing labs of NSTL, Inc., recently completed the most in-depth and comprehensive study on data compression done to date. This Software Digest Ratings Report rates Stacker™ highest in performance, versatility, ease of learning and ease of use. In fact, Stacker AT/16 and Stacker 2.0 software are the *only* products "*recommended*" by the report.

But that's to be expected for Stacker. After all, it's won just about every major award in the industry. Now who would you trust your data to?

So what are you waiting for? Your disk isn't getting any bigger while you sit there.

Get Your *FREE* Report Now!

If you're like most PC users, your data is worth more than your computer. So get all the facts before you choose a data compression product.

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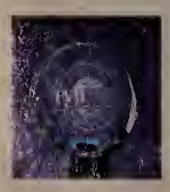
1990 ByteWeek Best of COMDEX



1991 PC Computing MostValuable Product

1991 PC Magazine Technical Excellence

1992 Byte Magazine Award of Distinction

1992 PC Magazine Editor's Choice

1992 Windows Magazine WIN Award

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Circle 271 on reader service card

Tool Up for New OS/2, Windows, Spreadsheets

This month we have a feast for spreadsheet users: John Walkenbach's article on the next generation of spreadsheets; 50 tips for using spreadsheets; and a review of 25 great spreadsheet machines, 33-MHz 486DXs all, with built-in math coprocessors. We also offer the first in a series of articles comparing the merits of OS/2 2.0 and *Windows 3.1*.

Some of the new spreadsheets' biggest advances lie in the user interface. Remember when the best user interfaces distinguished themselves by letting you cut and paste? The new spreadsheets leave the four-step complexity of cut-and-paste behind. Rather than selecting, going to the menu to cut, marking the destination, then going to the menu to paste, the new spreadsheets let you just select and drag. When you let go, you're done—with two trips to the menu eliminated.

Quattro Pro for Windows, 1-2-3 for Windows 2.0, Excel 4.0, and Lotus's *Improv for Windows* all offer major improvements in the organization of spreadsheet projects. Whether it's setting up 3-D data, managing multiple scenarios, simplifying application development, sprucing up display and print formats, or cranking out striking presentations, the new spreadsheets will save you time and make you more productive.

No one is better qualified to explore the nuances of the new programs than Contributing Editor John Walkenbach. He's been putting spreadsheets through their paces since the days of *VisiCalc* and has used almost every spreadsheet for DOS and OS/2. He's even tried spreadsheets that never made it to market. Walkenbach's *PC World 1-2-3 for Windows Complete Handbook* and *PC World Excel for Windows Complete Handbook* demonstrate the depth and breadth of his expertise. A background in psychology (he holds a Ph.D.) sharpens his evaluations of user interfaces. Don't miss his article, "Spreadsheets: The Next Generation."

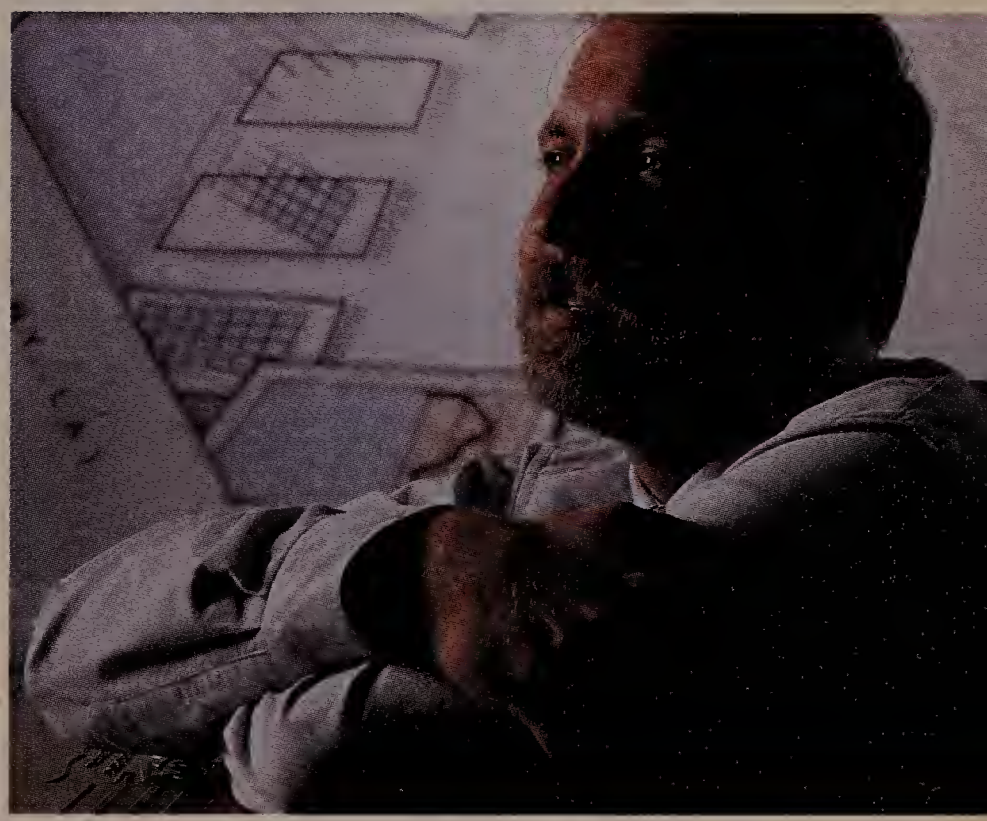
Until you get your hands on one of the new spreadsheets, you can make life easier and more productive by reading our compilation of "50 Spreadsheet Tips." We've picked the brains of spreadsheet jockeys, software developers, and our own staff to boost your productivity with *1-2-3, Excel,* and *Quattro Pro.*

The Hardware Fix

Sometimes the best solution to an office computing problem is to find new software or get a consultant to write a custom application. Nevertheless, there's nothing quite as satisfying as solving a problem by throwing hardware at it. When the problem is purely one of speed, hardware these days is the quickest and most cost-effective solution.

The ideal hardware for numeric problems like those that spreadsheets tackle includes a math coprocessor—something the 386SX, 386DX, and 486SX lack. The 486DX, 486DX2, and Intel's OverDrive upgrade to the 486SX come with math coprocessors on board. Of these, the 486DX is the most familiar, the most readily available, and the reigning performance king. In "33-MHz 486s: Hot Commodities," we take a close look at 33-MHz 486DX machines, from ALR to Zeos, from EISA to ISA to Micro Channel. The battle for Best Buy is fierce, with numerous reshuffles caused by prices changing as we went to press.

A new 486DX system is also the right thing to throw at *Windows* and OS/2, both notorious for hogging resources. For our feature preview, "OS/2 2.0 Challenges Windows 3.1," Peter



John Walkenbach explores the landscape of new spreadsheets.

ROBERT CARDIN

Varhol put a late beta version of OS/2 2.0 through its paces on three IBM-compatibles—a 386DX/33, an AMD 386/40, and a 486DX/33. He multitasked *Windows* and DOS applications without compatibility problems. Varhol, a business consultant and a teacher of computer science and math, knows graphical user interfaces as extensively as John Walkenbach knows spreadsheets. Varhol has used *Windows,* the Macintosh Finder, NeXTstep, and UNIX with both Open Look and Motif. He waded through OS/2's Workplace Shell, dragging his canoe of DOS and *Windows* applications behind him. At the end of his explorations, Varhol likened OS/2 2.0 to the space shuttle and *Windows 3.1* to a Chevy with a fresh coat of paint and bald tires. The decisive issue in the war between IBM and Microsoft? The size of your parking space.

Phil Lemmons

PHIL LEMMONS
EDITOR IN CHIEF

Creating borders in Word for Windows was easy for test participants—they simply chose the easy-to-locate "Border" command.

Exotic Excursions
23 Cajun Court
New Orleans, LA 36857

May 15, 1992

Steve Sullivan
8762 W. 180th Pl.
San Diego, CA 98034

Dear Steve:

During the past two years **Exotic Excursions** has seen a record 200% growth in revenues. This success has been exciting, but we now must adjust for our very fast growth. The size of our office impedes proper customer service and is inadequate for the increased level of store traffic.

- I propose that we open another **Exotic Excursions** office, since our phenomenal growth of the past three years is likely to continue.
- ***Thousands of potential clients will attend the grand opening of the new Exotic Excursions office.***

Bold or italics? It was easy with one click of the mouse.

Creating a bulleted list was two steps in Word for Windows and 12 steps in WordPerfect for Windows.

My staff are currently inspecting some potential locations in the Bay Court Plaza. Rental agents have told us that almost 10,000 people pass through this retail space weekly on their way to offices, restaurants, and shops. The table below shows cost projections for three different space configurations.

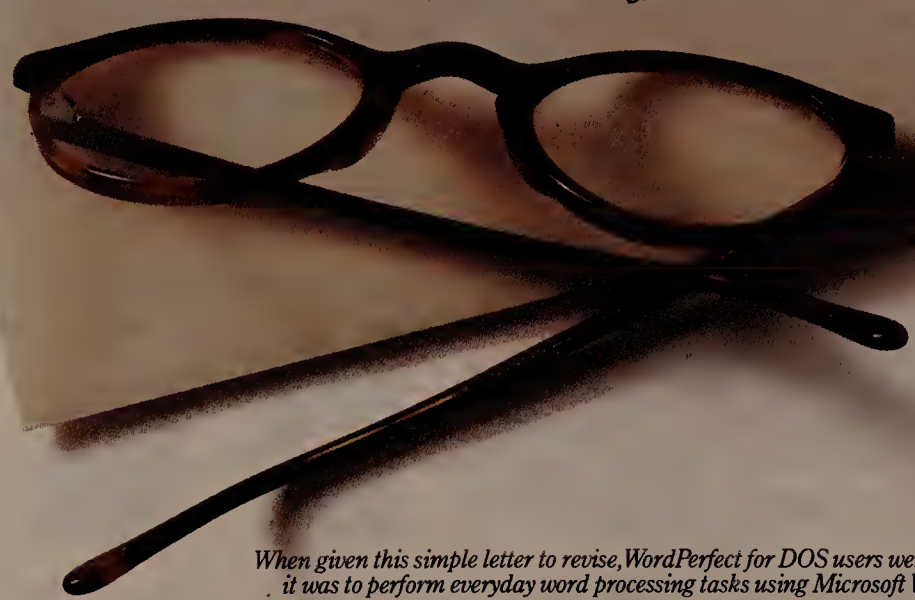
Location	Floor	Meeting	Bath	Street	Cost/Sq.
Court A	4500	N	Y	Main	$2100
Court B	2100	N	N	Main	$590
Court C	3400	Y	Y	52nd	$1000

Word for Windows has an on-screen "Tables" function that lets you add rows almost instantly.

I recommend that we lease the Court C location. This ...
It is substantially ...

Exotic Excursions
23 Cajun Court
New Orleans, LA 36857

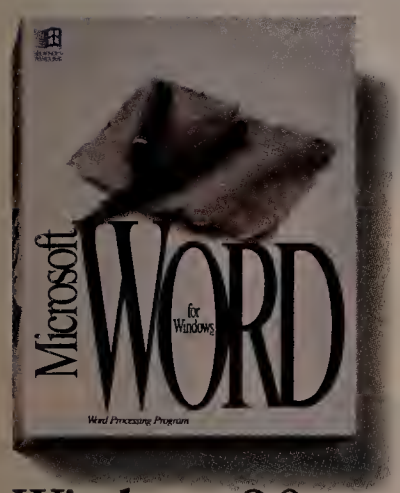
Steve Sullivan
8762 W. 180th Pl.
San Diego, CA 90834



Printing envelopes? Easy. We mean REAL easy. There's an envelope command right on the screen that addresses and prints automatically.

When given this simple letter to revise, WordPerfect for DOS users were impressed at how easy it was to perform everyday word processing tasks using Microsoft Word for Windows 2.0.

No wonder WordPerfect users prefer Word for Windows. It has easy written all over it.



In a recent test conducted by the National Software Testing Labs (NSTL), nearly eight out of 10 WordPerfect® for DOS users preferred Microsoft® Word for Windows™ 2.0 over WordPerfect for Windows. The reasons were plenty.

They were amazed at how Word for Windows put them one step away from accomplishing everyday word processing tasks with, in many cases, one simple click of the mouse. Which may have surprised them. But it didn't surprise us. After all, we designed Word for Windows around them.

Every week during the development of Word for Windows, we invited WordPerfect users to bring in their letters, memos, or whatever business documents they use in their own jobs, and try them out using Word for Windows. Our Product Development people at Microsoft called these sessions "usability studies." Which is just a fancy, shorter way of saying "what-do-people-use-a-word-processor-for-and-how-can-we-make-it-easier-for-them-to-use-it."

These studies not only helped us to design features that make everyday tasks easier, but helped us to make the more advanced word processing features like grammar checking, drawing and charting, easier to use as well.

Call for a free "Word Challenge Kit." Included is a videocassette highlighting the test, and interviews with WordPerfect users who took the challenge. Also in the kit are the files you need to test Word on your own. Call (800) 323-3577, Department Y91. We think once you judge for yourself, you'll want to take advantage of our special $129 upgrade offer.* Then, no doubt, you'll end up spreading the word for us.

Microsoft®
Making it easier

*Offer good for current licensees of WordPerfect, MultiMate,® WordStar,® MS® Word for MS-DOS® and DisplayWrite.® Please allow 2-4 weeks for delivery upon receipt of order by Microsoft. Offer expires 6/30/92. Limit one per customer. Reseller prices may vary. Call for system requirements. Offer good only in the 50 United States. To receive only the NSTL test results: In the United States, call (800) 323-3577, Dept. Y91. For information only: In Canada, call (800) 563-9048; outside the U.S. and Canada, call (206) 936-8661.

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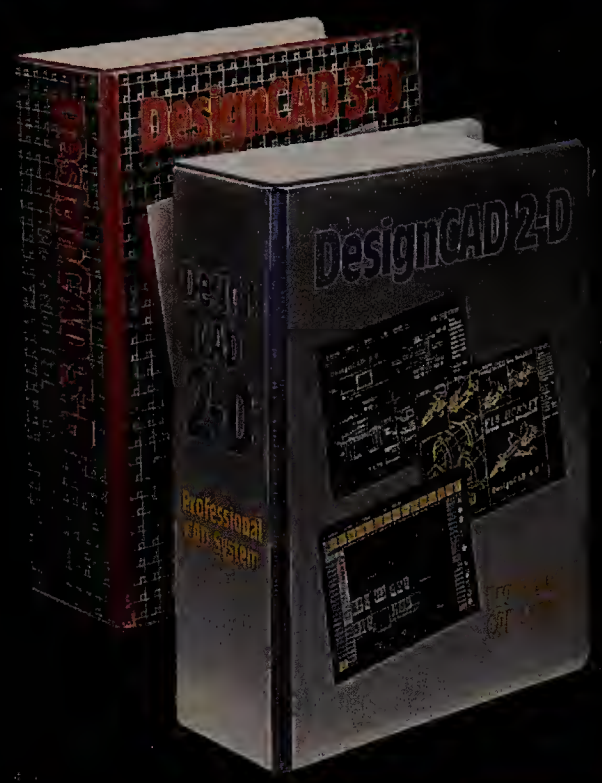
GO FIGURE!



DesignCAD 2D. Like Leonardo da Vinci's concept of a rotary blade aircraft, it is ahead of its time, not only in technology, but also in cost and value.

DesignCAD 2D is only $349, and it has more and better features than the other CAD programs that cost $3,000!

And, if you're ready for a three dimensional CAD program, there is the state-of-the-art DesignCAD 3D . . . for only $499!

So, how come theirs costs several thousand dollars and ours costs a couple hundred? Go figure. (Why do you think the Mona Lisa is smiling like that?)

Computer Shopper Best Buy of 1991 — CAD/CAM Software

PC Magazine Editors' Choice

PC Magazine Editors' Choice

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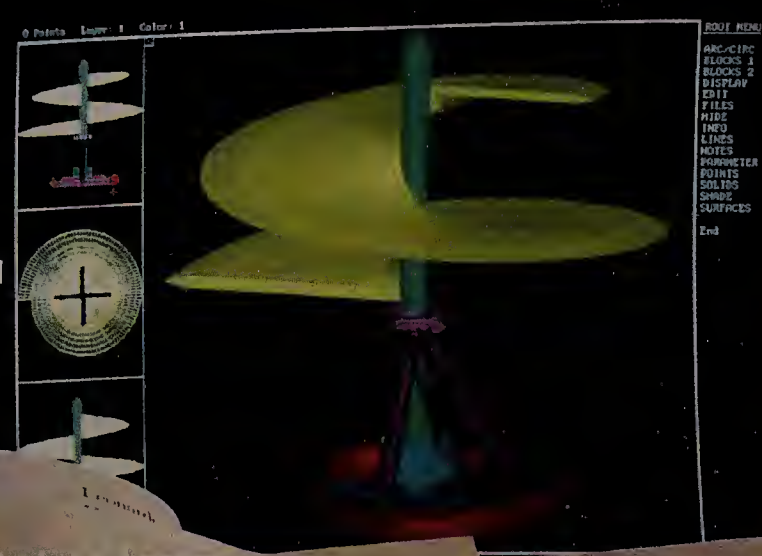
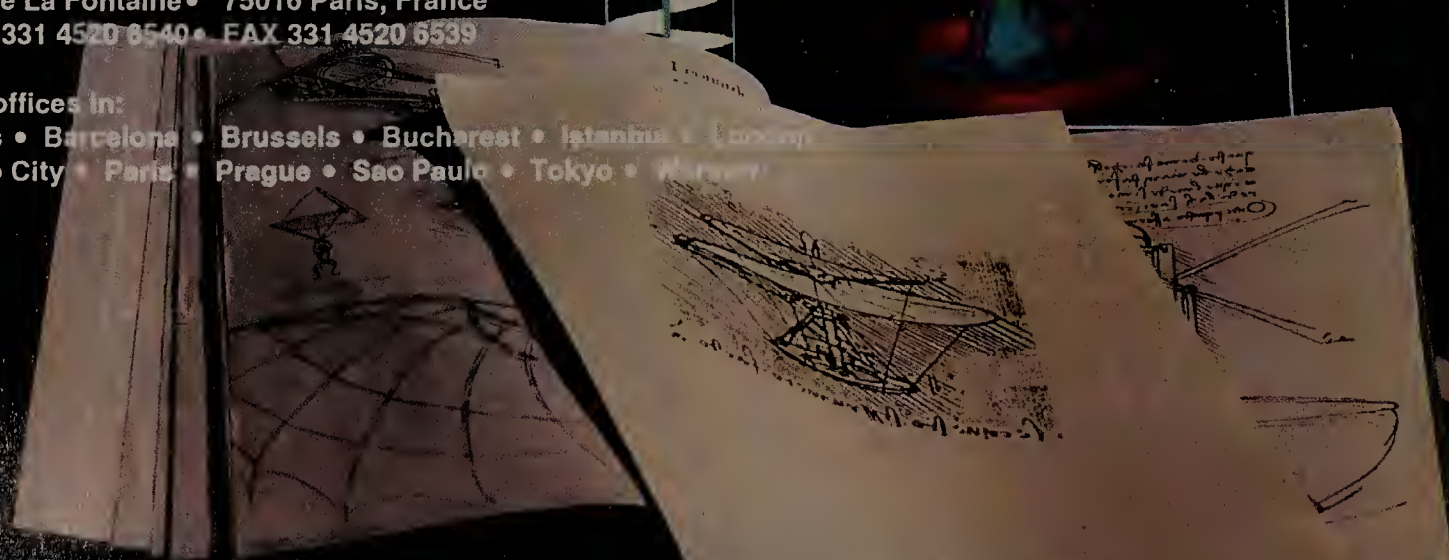




Also Available for Macintosh

Circle 306 on reader service card

LETTERS

Reactions and responses from the PC World community

Offshore Computing

In the February *Industry Outlook* item "Fewer PCs Made in United States," Mark Tomco, a manager for a U.S. motherboard manufacturer, suggested that one reason computer makers are moving overseas is the expense involved in satisfying American environmental regulations. As a member of the nuclear power community, I understand the expense and burden of government regulations. However, I find this response from the industry reprehensible.

If indiscriminately dumping waste is a motherboard manufacturer's policy, alarming parallels can be drawn to the chemical industry in the 1950's, 1960's, and 1970's. Where the bottom line dictated waste-disposal practices, chemical companies were shocked when environmental policies tightened and required them to spend millions cleaning sites where waste had been legally (if shortsightedly) dumped.

If companies manage to evade financial responsibility, we taxpayers may have to support Superfunds to clean up their toxic waste sites worldwide.

As global citizens we should be morally outraged at this type of environmental expediency.

JOHN PHILBROOK
ORLANDO, FLORIDA

What a Relief!

The "50 Tips for DOS and Windows" article in the January issue is wonderful! The writers did a bang-up job. If you continue with this type of writing, I will burn all my other magazines and not renew any other subscriptions.

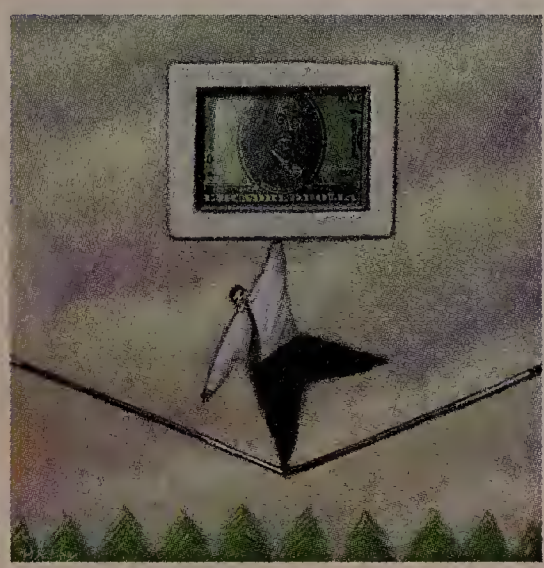
GUS HALLGREN
GREEN VALLEY, ARIZONA

ANTHONY RUSSO

What a Headache!

I am appalled by the January "50 Tips for DOS and Windows." I thought it would offer some new *Windows* tips, but half of the items are retreads! Why didn't you promote the article as "Yesterday's News Today"?

GARY FUNK
BAKERSFIELD, CALIFORNIA



GREG HALLY

More Ways to Recycle

An excellent article about recycled toner cartridges appeared in January's *Consumer Watch* column. Regrettably, it did not mention The International Cartridge Recycling Association (ICRA).

The ICRA represents more than 600 member companies who remanufacture laser toner cartridges, re-ink ribbons, and recycle other computer-related products.

ICRA will provide the names of member companies in the local area to anyone who calls us at 202/857-1154.

WILLIAM E. KELLEY
EXECUTIVE DIRECTOR
THE INTERNATIONAL CARTRIDGE
RECYCLING ASSOCIATION
WASHINGTON, D.C.

Fallout

May ten tons of Minnesota snow bury the automobile of Contributing Editor Steve Bass for the regional bias shown in February's *The Home Office.*

Bass remarked that "buying by mail-order doesn't have to mean buying a risky, no-name clone from a Midwest garage." I would point to operations here in the Midwest such as Northgate, Zeos, and Gateway, which provide quality products and excellent service and stability.

In the same issue is an article about four companies in Bass's home state of California that apparently made off with consumers' money and their trust. If you want to buy something risky, deal with those California storefronts, not Midwest garages.

JON KUTZ
LAKE CRYSTAL, MINNESOTA

Contributing Editor Bass apologizes for his regionally incorrect remark and plans to make his next computer purchase from one of those, uh, Midwest garages.—Ed.

Tips for the Road

I enjoyed your February feature "Tips for the Road: The Mobile Professional's Travel Guide." However, your heroine calls your hero a dweeb for fearing the effect of airport security gate X rays on a laptop computer's hard drive. I have read elsewhere, however, that it is not a good idea to put laptops through airport X-ray machines.

R. FOLSOM
SAN FRANCISCO

X rays don't create magnetic fields. They are light, which is why they can expose the film in your camera. In order to cause damage to your hard disk's data, the light rays in an airport's X-ray machine would have to be intense enough to actually melt your system.—Ed.

Out, Vile Jelly!

Many words have been inked about the ongoing "look and feel" lawsuit by Apple against Microsoft and Hewlett-Packard, but none from the standpoint of the consumer.

I'm sick of this "look and feel" nonsense. I'm so sick of it that I'm going to copyright my look, mainly the fundamental components—eyes, nose, mouth, and ears, following Apple's example. I will license my copyright free to everyone except those greedy "look and feel" promoters. So, before they utter any more of this rubbish, they'd better gouge out their eyes, cut off their noses and ears, and sew up their mouths because they are infringing on my copyright.

BYRON SHEN
BERKELEY, CALIFORNIA

Doorway

I'm disappointed you did not consider Marshall Dudley's excellent *Doorway* in your review of remote PC software ["Remote Communications Software: The Next Best Thing," February 1992]. *Doorway* is well known in BBS circles because it performs its task admirably. Your omission of Dudley's product was unfair. Admittedly, *Doorway* has a small user base, but that's mostly due to limited advertising.

WILLIAM PADILLA
GLENDALE, CALIFORNIA

Welcome to the Nineties

In the March *Letters*, Colin Chow was upset that a $50 upgrade for *ObjectVision* came out so soon after he purchased it. What's the problem? Fifty bucks is not a lot to pay for all the new features in *ObjectVision 2.0*, and Borland's speed in upgrading *ObjectVision* simply reflects the power of OOP and Borland's confidence in it.

GLENN WHITE
MT. RAINIER, MARYLAND

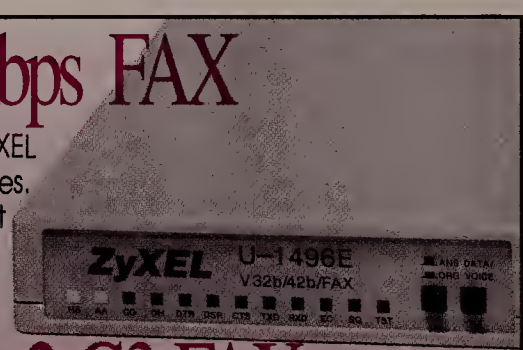
Buy a Color Monitor!

As an advanced *1-2-3* release 2.3 user, I was ready to switch to *Quattro Pro 3.0* (because of its strong graphing features) until I learned it requires a color monitor to run in WYSIWYG mode. Considering Borland's reputation and its desire to overtake *1-2-3*, I find this to be a significant omission. When I called Borland tech support, they said "Buy a color monitor."

John Walkenbach's "Quattro Pro 4.0" preview [March, 1992] makes no men-

14.4Kbps Data +14.4Kbps FAX

ZyXEL modems let you talk fast. At 14,400 bps, ZyXEL modems offer incredible speeds at low, low prices. Reliable, error free data transmission is assured at speeds from 300 bps to 57.6Kbps, while offering V.42 and MNP®4 error correction.



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ZyXEL modems are compatible with a host of high speed modems and fax machines which support CCITT standards and with Class 2 G3 FAX, V.17 - 14.4Kbps send and receive. Plus, ZyXEL modems automatically fall back/forward to the destination modem or fax. This allows you maximum throughput and compatibility with industry standard modems.

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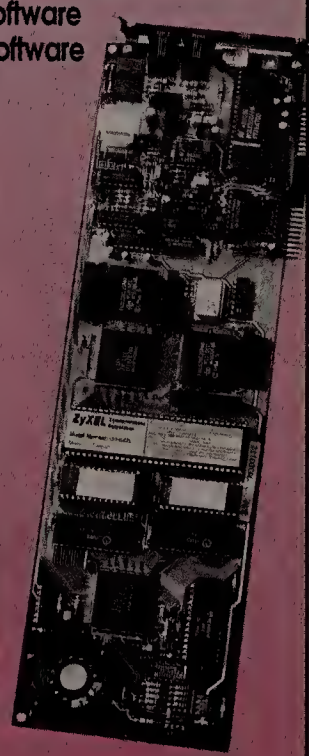
ZyXEL modems come with a full 5-year parts/labor warranty, a 30-day, money-back guarantee**, and full technical support. On-line ZyXEL BBS Service: (714) 693-0762.



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The 386SX with the lowest cost upgrade.

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The One & Only

Acer is the only company that lets you upgrade your 386SX computer to a 486 using a single chip. Others ask you to buy an upgrade module, costing $500-$1,000.

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Other PCs let you double your CPU clock speed. But that's all. With the unique Acer CPU upgrade technology, you can get up to four times your processing power.

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PC World, January, 1992

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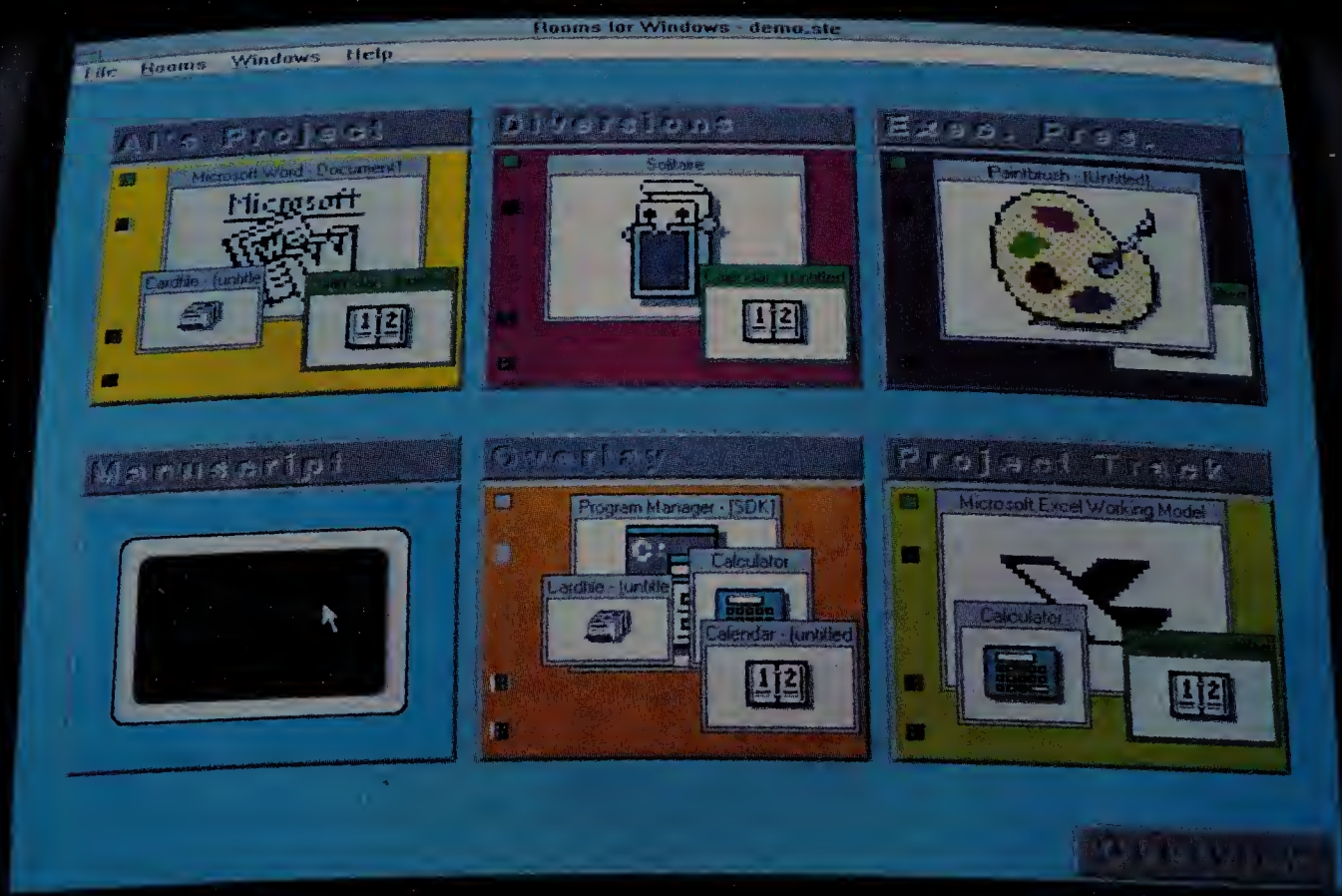
Windows is now
new manageme



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XEROX

under
nt.

Sure Windows is great. Except that you spend more time managing your desktop than actually working on it. Until now, that is. Because XSoft's new Rooms for Windows software has made working in Windows much more manageable.

Rooms is an enhancement to your existing Windows software. It's also a considerable enhancement to your productivity.

Think about what happens now when you're running several applications. You have one desktop to work in, with all your files squeezed into the screen like sardines in a can.

With Rooms, you can set up an unlimited number of desktops, or Rooms. Each one with its own combination of applications and files, arranged on the screen however it makes the most sense to you.

In Windows, the more programs you use, the more opening, closing, reopening, and positioning of applications is required. Not so with Rooms. Simply by pointing and clicking, you can move from Room to Room instantly. Even if the Room you're moving to contains a completely different set of applications and files.

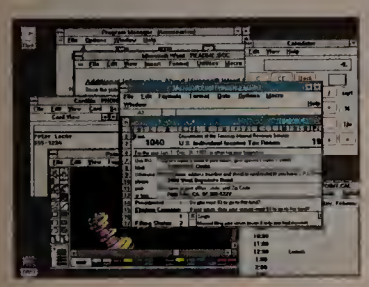
You can even set up Rooms for DOS applications. Moving from a Windows Room to a DOS Room is an easy point and click operation. And getting back to a Windows Room takes but a keystroke.

As if that's not convenient enough, all your files and applications stored in all your Rooms can open automatically, every time you turn on your PC! Then when you enter a Room, everything's ready to go, and set up exactly as you last saved it.

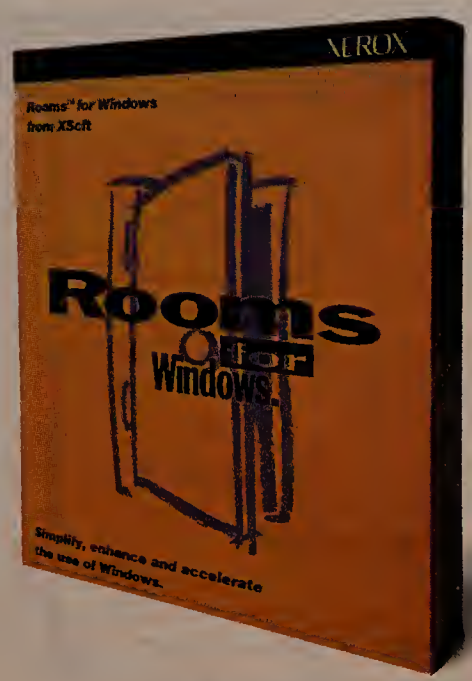
So you see, Rooms is actually much more than a mere Windows enhancement. It's a management overhaul.

To purchase Rooms for Windows, visit your nearest dealer or call 1-800-626-6775. In Canada call 1-800-668-0199. In Quebec call 1-800-668-0133. Suggested retail price $99.

Xerox
The Document Company



Without Rooms around to manage things, Windows can be quite difficult to work with.



Circle 322 on reader service card

tion of *Quattro Pro*'s WYSIWYG limitations with mono monitors.

I know you can't do anything about Borland's omission, but please tell your writers a lot of users don't have 386s with VGA (or even EGA) monitors.

PAM BECKER
SAN MATEO, CALIFORNIA

Quattro Pro *does indeed require an EGA or VGA card to run in WYSIWYG mode. However, the monitor itself does not need to be color. Generally, when discussing a product that works with a graphical user interface, it's assumed that the user needs to have a graphics card. —J. W.*

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The best fax software you can buy." PC/Computing, August 1991

"The best overall product is Faxit" and "The granddaddy of all fax software." Windows Magazine, March 1992

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Quattro Pro 4.0

Your March article "Quattro Pro 4.0" was very thorough and even-handed, though it did contain an error concerning WYSIWYG importing.

The article states *Quattro Pro* "cannot handle FM3 formatting files from *1-2-3*'s WYSIWYG add-in." *Quattro Pro 4.0* will import format files from *Allways, Impress,* and the Wysiwyg add-ins for both *1-2-3* release 2.*x* and release 3.*x*. All *1-2-3* users have the option of migrating to *Quattro Pro 4.0* while conserving work done with *1-2-3* formatting add-ins.

MARSHAL MOSELY
QUATTRO PRO PRODUCT MANAGER
BORLAND

Corrections and Clarifications

On page 139 of March's "PC Price War: 486SX vs. 386/40," we published the wrong phone number for AST Research. The correct phone number is 800/876-4278. AST apologizes for leading us astray.

In the March "Super-VGA Monitors Buyers' Guide," footnote number 1 on page 184 is incorrect. The ZDS ZCM-1650 is not a flat-screen monitor.

The Instant Reference Card for *Word for Windows* in the March issue contains an error. Page 267 shows the scissors as the icon for Undo Last Action. The eraser is the correct icon for Undo Last Action.

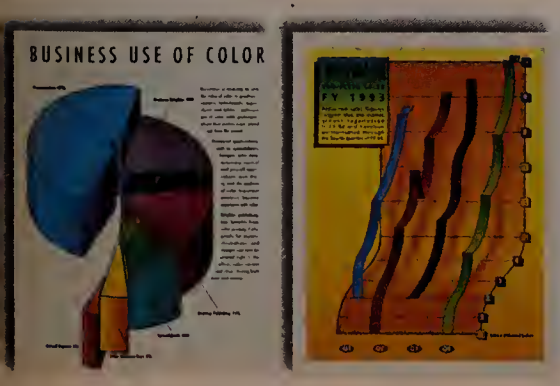
April's *Top of the News* item "Lotus Unveils 1-2-3 Plans" states that *1-2-3 2.4* will have multifile capability. This capability will not be available in the *2.*x line until this fall, when a new version arrives.

Page 164 of "Windows Word Processors" in April contains incorrect information about *WordStar. WordStar 6.0* did not come with a grammar checker (*WordStar for Windows* does).

Since we published the review, *WordStar 6.0* has been superseded by *WordStar for DOS 7.0,* which does include a grammar checker and other utilities. The phone number for ordering version 7.0 is 800/227-5609. *PC World* regrets the errors.

HP's PaintJet XL300. Now, brilliance doesn't require genius to install.

At last. A 300 dpi color printer that's as easy to add to your system as a LaserJet.



Vivid color has never been so simple. The new PaintJet XL300 inkjet printer gives you laser-quality color graphics, text, and the compatibility of HP LaserJet printers. All for the remarkably low price of just $3,495.*

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HEWLETT PACKARD

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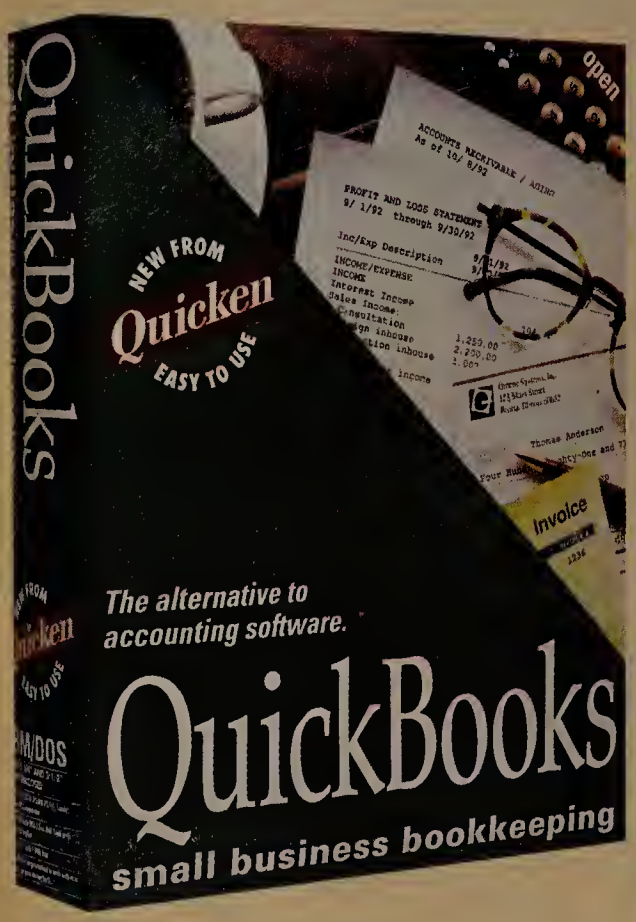


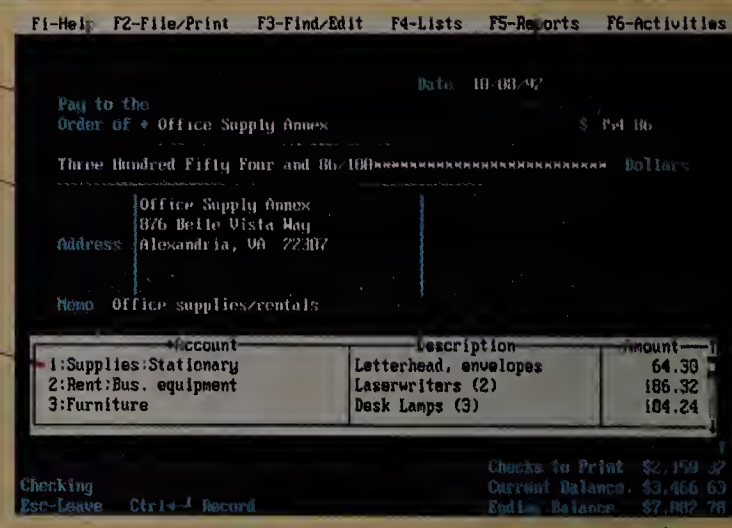
Specifications: PC compatible computer with 640K RAM and DOS 2.1 or higher. Hard disk with 2 MB free.

Stunningly simple to use.

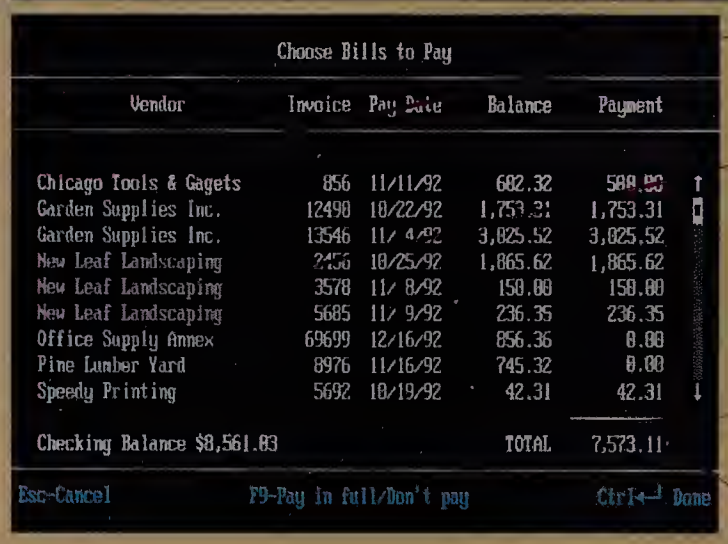
Work with familiar forms.

Only enter information once. QuickBooks remembers your recurring payments.

Flexibly assign expenses.



Choose whom to pay and when.



Choose Bills to Pay

Vendor	Invoice	Pay Date	Balance	Payment
Chicago Tools & Gagets	856	11/11/92	682.32	500.00
Garden Supplies Inc.	12490	10/22/92	1,753.31	1,753.31
Garden Supplies Inc.	13546	11/ 4/92	3,825.52	3,825.52
New Leaf Landscaping	2456	10/25/92	1,865.62	1,865.62
New Leaf Landscaping	3578	11/ 8/92	150.00	150.00
New Leaf Landscaping	5685	11/ 9/92	236.35	236.35
Office Supply Annex	69699	12/16/92	856.36	0.00
Pine Lumber Yard	8976	11/16/92	745.32	0.00
Speedy Printing	5692	10/19/92	42.31	42.31
Checking Balance $8,561.03			TOTAL	7,573.11

Esc-Cancel F9-Pay in full/Don't pay Ctrl-↵ Done

Just select the bills you want to pay from this list.

Payments to the same vendor can be combined.

Prints checks automatically for all bills selected.

Shows your bank balance.

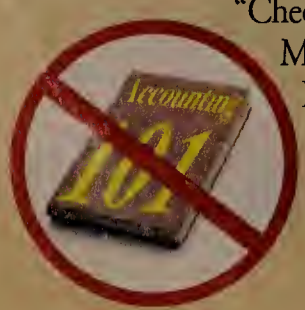
Totals how much you owe.

No accounting mumbo-jumbo.

With accounting software, you had to "post" "debits and credits" and "reverse entries" in "journals" and "ledgers." You practically needed to be a CPA.

But now you can computerize your books without any accounting mumbo-jumbo.

New QuickBooks uses just plain English. If you want to pay a bill, choose "Checkbook" from the Main Menu.

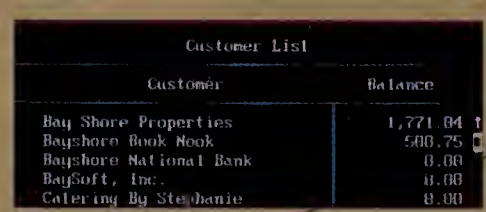


If you want to invoice a customer, choose "Invoicing." It's that simple.

Invoice customers in minutes.

Practically no typing.

Pick here:



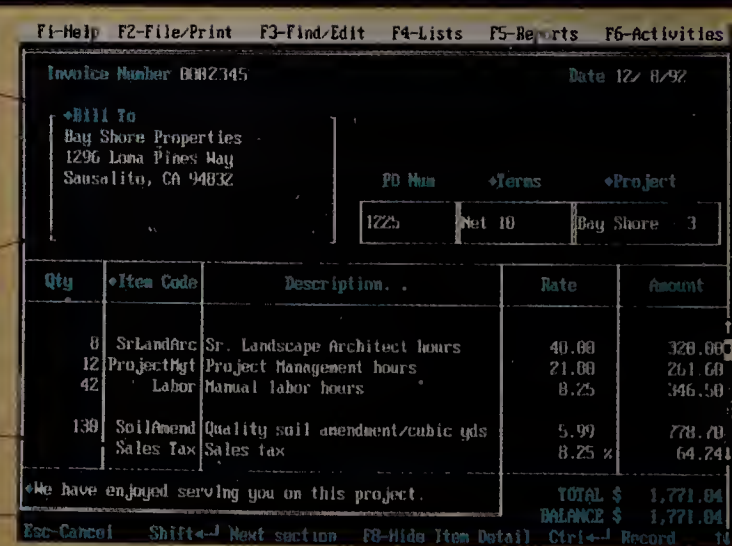
Customer List

Customer	Balance
Bay Shore Properties	1,771.84
Bayshore Book Nook	500.75
Bayshore National Bank	0.00
BaySoft, Inc.	0.00
Catering By Stephanie	0.00

It's entered here.

Sales tax is calculated for you.

The math is done for you.



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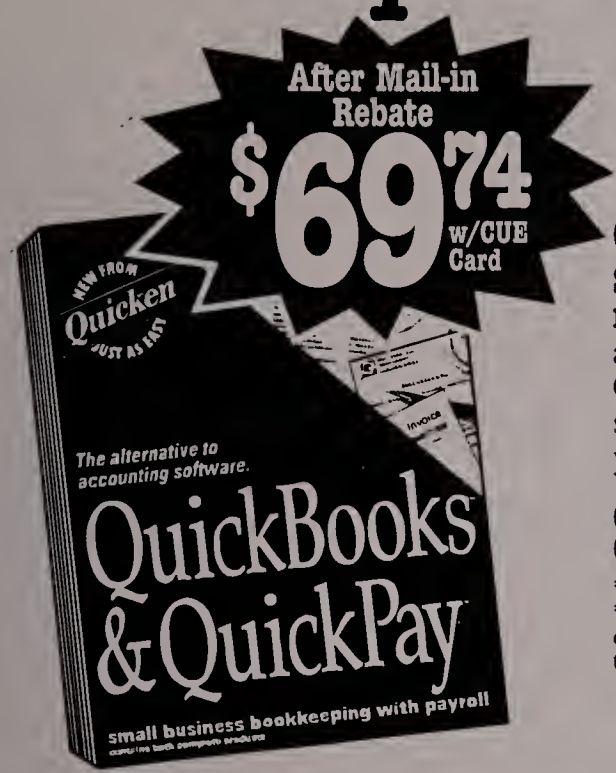

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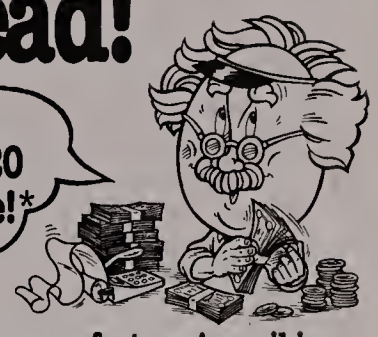

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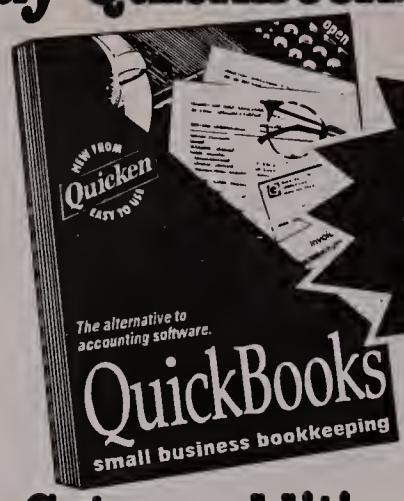

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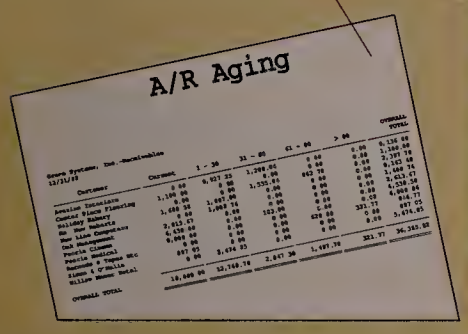


Collections Report

As of 12/31/92

Green Systems, Inc.

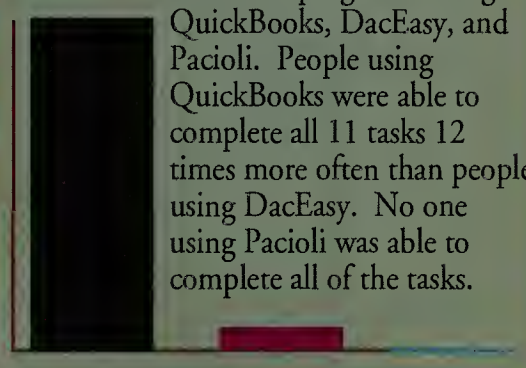
Customer	Invoice	Issued	Due	Balance Due
New Line Computers	1825	9/ 2/92	10/17/92	1,888.76
Mr. Ridge Evers				
(309) 676-9896 ext 124		Total New Line Computers		1,888.76
Oak Management	1886	10/ 5/92	12/ 4/92	818.92
Mr. John Driscoll	2081	10/12/92	11/26/92	57.75
(309) 673-7897 ext 234				
		Total Oak Management		868.67
Peoria Cinema				
Mr. Garry Pasweitz	1841	9/17/92	11/16/92	6,435.88
(309) 673-9856 ext				

Green Systems, Inc.-Receivables

Esc-Create Ctrl-M Memorize F1-Help Ctrl-P Print

QuickBooks proven 12 times easier than leading products.

An independent research firm had small business bookkeepers perform 11 of the most common bookkeeping tasks using QuickBooks, DacEasy, and Pacioli. People using QuickBooks were able to complete all 11 tasks 12 times more often than people using DacEasy. No one using Pacioli was able to complete all of the tasks.



Source: Merrill Research & Associates

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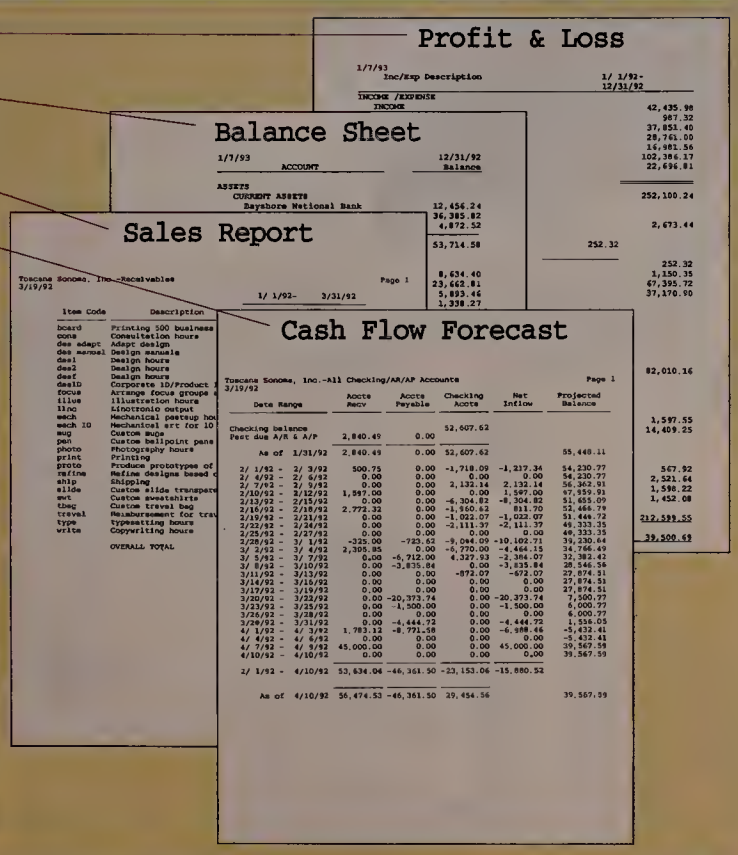
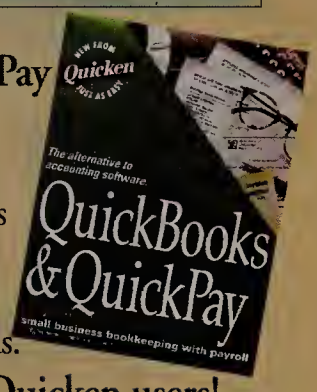


Complete Financial Reports

- Profit and loss statement
- Sales report
- Accounts receivable aging
- Collections report
- Accounts payable aging
- Sales tax report
- 1099 report
- Cash flow forecast
- Payroll report
- Budget report
- Other reports
  - Summary report
  - Transaction report
  - Itemized income and expenses
  - Project or Job report

Works with QuickPay for payroll.



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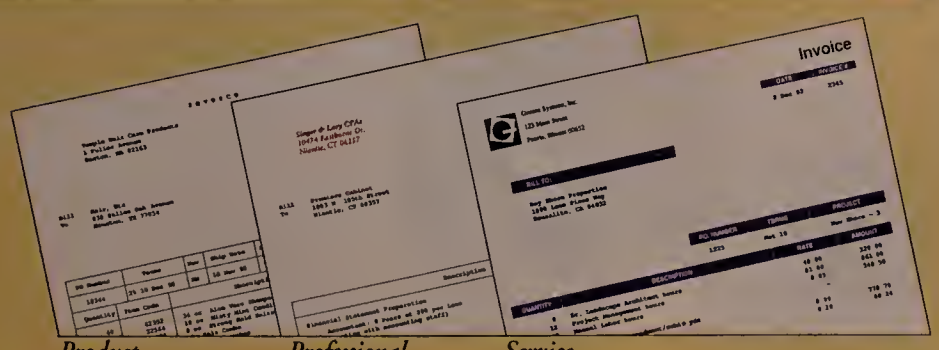

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POWER TIP NO. 250

True Flush-Right Alignment in 1-2-3

When you use the double-quote (") label prefix to right-align your cell contents, one space is always retained at the right border. For true right alignment, you must left-align the label with the single-quote (') prefix and insert the correct number of leading spaces. This macro counts the spaces you need, no matter what the cell width. You can run it again if you increase cell width, but if you reduce, you must delete the existing leading spaces before rerunning. For example, to set up the macro in cells G1..G3, place your cursor in cell G1, type **{edit} {home} {del}**, and press **<Down>**. Then type **'@repeat(" ",@cell-pointer("width")-@length(@cell-pointer("contents")))&"** and press **<Down>**. Finally, type **{end}"{calc}~** in cell G3, press **/RNC**, and enter \ followed by the macro call letter. Highlight the range G1..G3 and press **<Enter>**. Then place your cursor on a cell holding a label you want right-aligned, hold down **<Alt>**, and press your macro call letter.

Shane Devenshire
Walnut Creek, California

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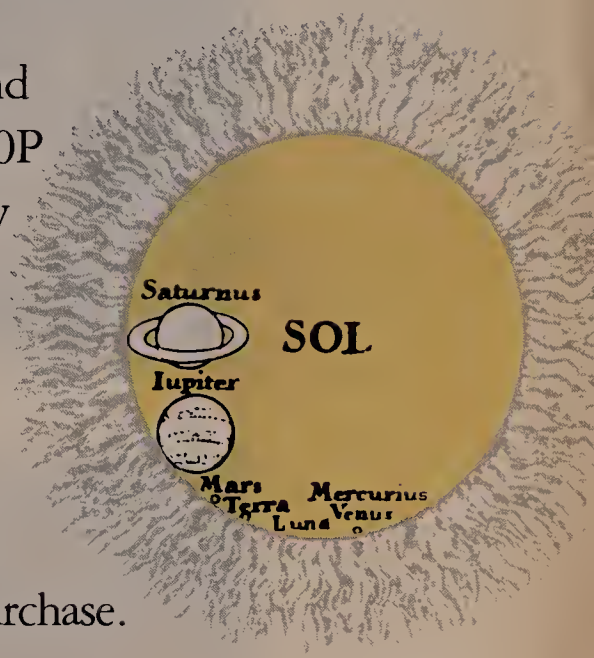

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Your Telephone No. _____ Your FAX No. _____

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- ☐ DECpc i486 and i486sx based systems
- ☐ The DECpc 320P Notebook
- ☐ The Catalog

Customization Worksheet

Your base system is a: ☐ 286 ☐ 386 ☐ 486 ☐ Other

How many applications will your PC(s) run in a typical workday? _____

What best describes the type of work the system will be used for? (Check all that apply)

☐ Word Processing ☐ Desktop Publishing ☐ Scientific Research
☐ Order-entry ☐ Education ☐ Software Development
☐ Database (filing records) ☐ Design (CAD/CAM) ☐ E-Mail
☐ Financial Calculations ☐ Engineering ☐ Other industry-specific applications (please specify)
☐ Retail Store Management ☐ Industrial Process Control

How many people work in your group, department or small business?
☐ Less than 10 ☐ 10-20 ☐ 20-35 ☐ More

Is your operating system:
☐ DOS ☐ DOS with Windows ☐ OS/2 ☐ MAC ☐ UNIX™ ☐ Other

Which of the following graphics-oriented applications best describes your needs? (Check all that apply)

☐ Desktop Publishing ☐ Realtime Modeling ☐ AutoCad
☐ CAD/CAM ☐ Animation ☐ Business Graphics
☐ Image Processing

LAN Communication

How many PCs do you have installed? _____ From how many manufacturers? _____

What kinds of connections does your PC(s) require? (Check all that apply)

☐ Links with other PCs in the immediate surroundings
☐ Connection to the local area network (LAN) throughout a building
☐ A line to a host system in a remote location

What kind of media (cable) is used in your LANs today? _____

What is the networking software now being used in your company? _____

What kind of host system will your PC communicate with?
☐ DECpc ☐ IBM ☐ Other _____

What Kind of Service Do You Really Need?

☐ On-site Hardware Support ☐ Software Support ☐ Telephone Support
☐ Training ☐ FAX Hotline

How many of your users take portables on the road? _____

Do you currently have a service contract(s) for your PCs? How many? _____

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CONSUMER WATCH

BY ROBERTA FURGER

Advice and information for the computer consumer

Not So FastMicro

I ordered a Cyrix math coprocessor from FastMicro in late December. Two weeks later, I received my Visa bill reflecting a charge for the device, even though I had not yet received it. A call to FastMicro revealed that the item had not been shipped. A week later, two packages arrived. One contained what I had ordered; the other contained a 33-MHz coprocessor. Further, my Visa account had now been charged for both items.

I called FastMicro, and they promised to credit me for the second item as well as round-trip shipping costs. Nine days after FastMicro received the returned processor, I called again and found that my account still had not been credited for the device nor the shipping charges. This time I was told to write a letter to FastMicro's president if I wanted the shipping costs refunded. I was told I could not talk to him over the phone.

I still have not received the credit.

DOUGLAS P. MOARD, M.D.
APPLETON, WISCONSIN

After confirming the advertised price and verifying that the product was in stock, I ordered a copy of IBM's *Current* from FastMicro and gave them my credit card number.

I never received the software, so I called the toll-free number and explained that my credit card had already been charged. They told me they would look into it and call back. Two weeks later a FastMicro salesclerk called and told me there had been a price increase; I could either cancel my order or pay the difference ($100). I explained that I acted in good faith and paid for the item, and I expected it to be shipped at the original price. FastMicro said they would not send the product to me and would not respond to additional inquiries into the matter.

JOSEPH D. SMALLMAN
KNOXVILLE, TENNESSEE

Editor's note: Consumer Watch *has received over 15 letters in the last three months complaining about FastMicro. Customers reported having their credit card debited before a product was shipped, waiting on hold for long periods on the customer service line (a toll call), and experiencing long delays receiving merchandise. Some customers wound up paying interest on goods that were never shipped because of the lengthy delays.*

FastMicro general manager Bob Canning said many of the problems are the result of "growing pains" experienced by the company over the last several months. He added that FastMicro is expanding its customer service hours, installing a new phone system, and putting in a local-area network to bring sales, shipping, and receiving on line.

According to Canning, FastMicro's policy is to debit credit cards only when the order is sent to the shipping department. If a product is found to be out of stock after the card has been billed, the credit card is credited within a day. Canning acknowledged that this procedure was not followed in several cases, but emphasized that the company is working to rectify the situation.

Regarding cases such as Mr. Smallman's, where there is a price change after an order has been placed, Canning said FastMicro's policy is to charge the customer the lower price if his or her credit card was billed before the price change. If the price change occurs before the card is billed, the company calls customers and advises them of the increase. "If they're willing to go for it, we charge them the extra," said Canning. "Most of the time customers realize we can't sell things below cost. If they're adamant about getting the lower price, we give it to them," he added.

Mr. Smallman ultimately received Current *for the original price.*

The Not-So-Final Edition

I was in the market for *TurboTax* by ChipSoft. Looking over the ads in your January issue, I discovered that PC Connection offered the final edition of *TurboTax* for DOS, so I placed an order.

The software arrived promptly, but to my dismay, the package contained the headstart edition. I called the customer service department of PC Connection and asked why they had sent the headstart edition when their advertisement clearly read "final edition." Although the person I spoke with offered to refund my money, he implied that I should have known better because the final edition was not available until late January 1992.

If products offered for sale are generally known to be unavailable from the manufacturer, *PC World* should at least question the advertisers. Your sub-

ANTHONY RUSSO

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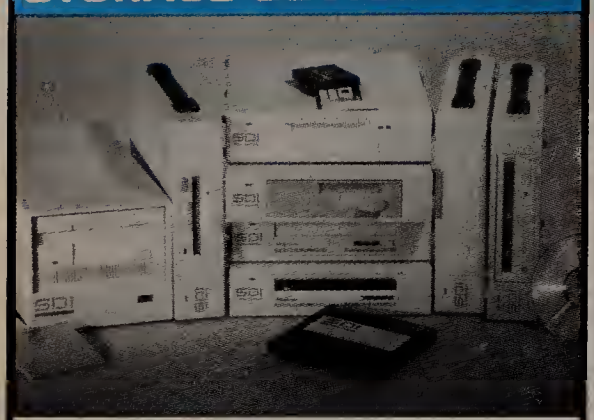

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ROBERT E. KONKEL
SARASOTA, FLORIDA

Editor's note: According to Peter Haas, director of customers affairs at PC Connection, the wording in the ad was a mistake. The phrase "final edition" was not supposed to appear until the February issue. PC Connection refunded Mr. Konkel's money and "apologized for the mistake and the impression that we felt he should have known better."

PC World *carries an average of 225 advertisements in each issue, many featuring dozens of products. We do attempt, whenever possible, to verify the legitimacy of the firms placing the ads, but we do not have the resources to verify availability of each advertised item. When a misleading or incorrect advertisement is brought to our attention, however, we promptly contact the individual company for a response, and when appropriate, a correction.*

No RMA, No Refund

I ordered a math coprocessor directly from Advanced Micro Devices, hoping it would speed up my desktop publishing applications. While the chip was en route, though, I discovered it wouldn't help after all, so I mailed back the chip with a note to credit my Visa card. When no credit appeared, I called AMD. The customer service representative said he would investigate and call me back. I never received a call, so I called again and was told I shouldn't have mailed back the package without an RMA number. The AMD advertisement, however, says nothing about RMA numbers for returns.

They have my money and the chip (still in the shrink-wrap).

DAN REILLY
LOS ANGELES, CALIFORNIA

Editor's note: Consumer Watch *contacted AMD on Mr. Reilly's behalf, and the company credited his Visa account for the returned math coprocessor. AMD, like virtually all hardware and software companies or distributors that sell directly to the customer, requires that all returned merchandise include an RMA (return merchandise authorization) number. To eliminate potential foul-ups, check*

BUG WATCH

Up-to-date information about hardware and software bugs

Norton Desktop for Windows and Solitaire

Windows 3.0 Solitaire aficionados who are also running version 1.0 of Norton Desktop for Windows may encounter a few snags. If the Sleeper function of Norton Desktop for Windows is activated, the mouse pointer sometimes disappears when you win a hand and exit the game. Call Symantec technical support and describe the problem, and they'll send you an update disk free of charge.
Symantec technical support
310/449-4900

PC Kwik 4.12 Lock out

If you're using Windows 3.0, DOS 5.0, PC-Kwik 4.12, and the Stealth feature of Quarterdeck's QEMM-386 6.0 (or later) memory manager, your computer may lock up when you try to exit Windows. Multisoft, the maker of PC-Kwik, has repaired this problem in version 4.13. Contact Multisoft to get the free fix.
Multisoft
503/644-5644, 503/646-8267 (fax)

Norton AntiVirus 2.0

Michelangelo's birthday has come and gone, but the virus still proliferates. Norton AntiVirus 2.0 will notify users of the virus and repair it on an infected floppy only when the application is run from DOS. If you run the program from Windows, it will notify you of the virus, but will not remove it. Instead, it gives an error message that the floppy disk is write-protected. To repair the disk, run Norton AntiVirus 2.0 from DOS. A fix is available from Symantec.
Symantec technical support
310/449-4900 —*Christina Wood*

Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with broadest interest.

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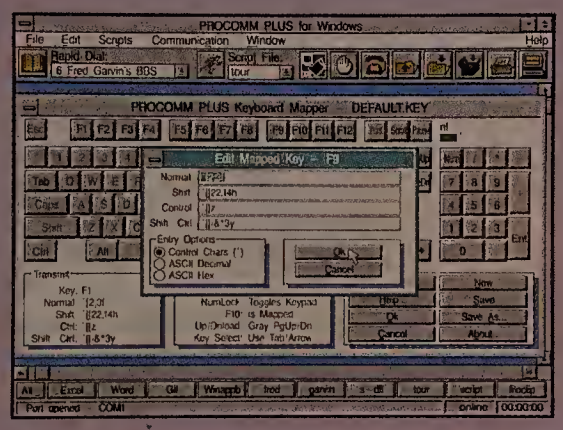

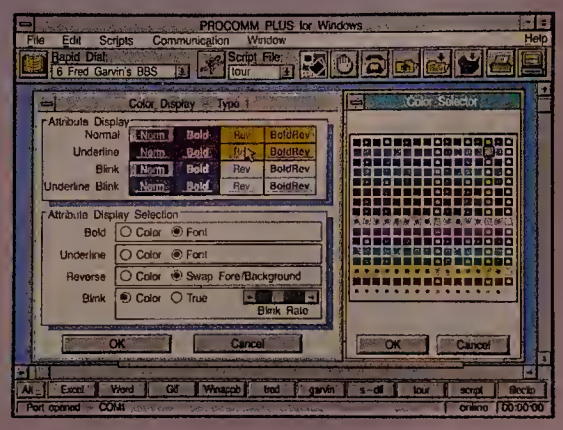

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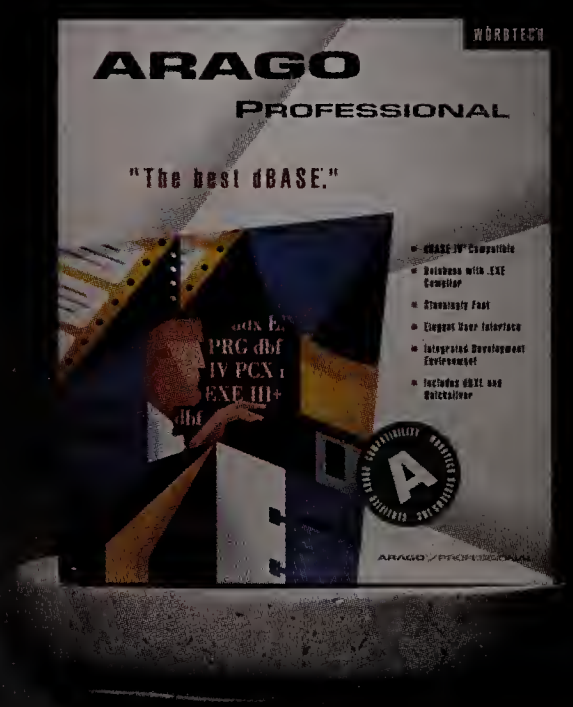

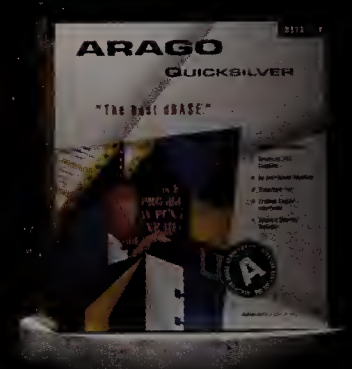

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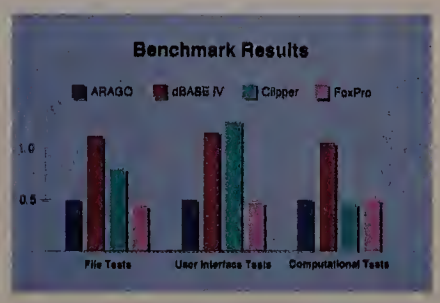

Independent benchmarks show that Arago dBXL runs up to five times faster than dBASE IV®, and that it also leaves all other dBASE® compatibles in the wings.

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Arago dBXL is compatible with the latest dBASE industry standard: dBASE IV. It is also compatible with dBASE III Plus™. So you can run millions of applications immediately and preserve any investment in existing programs.

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Arago dBXL is very easy to learn. First-time users can quickly get started with its INTRO menu. The "Tutor" line helps you learn new commands as you go. And with Arago's powerful HELP system, you also get immediate access to the on-line manual.

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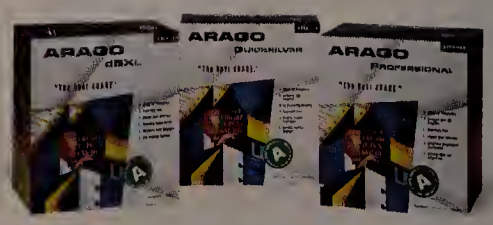

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...is an amazing program that moves diagramming from the quill-pen age to the computer age. In any business there are processes and procedures that must be documented. Diagrams have always been useful, but the difficulty in producing them by hand has severely limited that usefulness. No more, as EasyFlow is a powerful program dedicated to the fast creation and easy modification of Flow charts, Dataflow diagrams and Organizational charts.

The program's powerful features include automatic line routing and automatic text centering inside shapes. The multi-level charting ability, 270 output device options and unparalleled support for desktop publishing and graphics packages have helped position EasyFlow as the DeskTop Flowcharting tool of choice with corporate managers.

NodeMap™

...is specifically designed to help prepare LAN and WAN diagrams, telecommunication diagrams, and similar diagrams showing the interconnection involving computers and communication devices. Nodemap comes with the standard telecommunication and network planning symbols. Why spend valuable time tracing templates when you can select from a predefined library of shapes?

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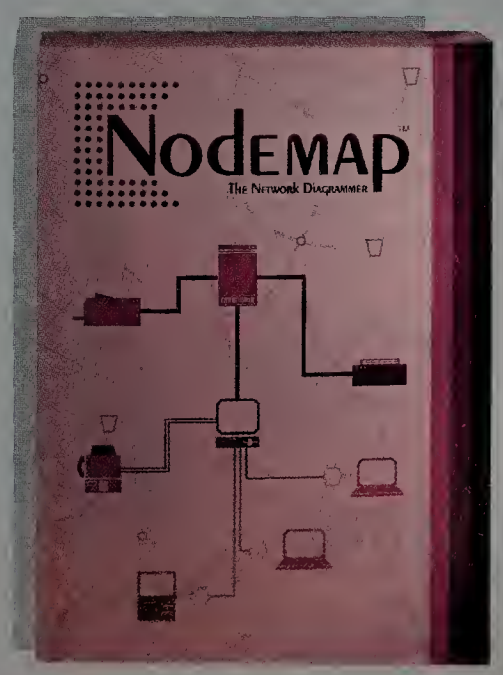

HavenTree's products are network ready with metering software and run on IBM PCs and compatibles (provided they have 512 K memory and a graphics video adapter).

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with a vendor before returning hardware or software. Chances are you'll need an RMA, even if it's not specified in the literature.

Reshrink-Wrapping Revisited

I purchased a shrink-wrapped copy of Digital Research's DR DOS 5.0 from CompUSA. When I opened it, I found that the plastic envelope containing the software disks had already been opened. Several pages of the documentation were soiled and smeared, and Digital's customer letter was stained with coffee.

I kept the package because the CompUSA store was too far away to go back for clean documentation, but I made sure the disks were virus-free before I used them.

STEWART O. SEMAN
HINSDALE, ILLINOIS

Editor's note: The above letter is in response to a letter in the March Consumer Watch *from an individual who bought a shrink-wrapped software package at CompUSA, only to find that it had already been used. A CompUSA spokesperson said they reshrink-wrap only shop-worn merchandise; used software is returned to the developer for credit.*

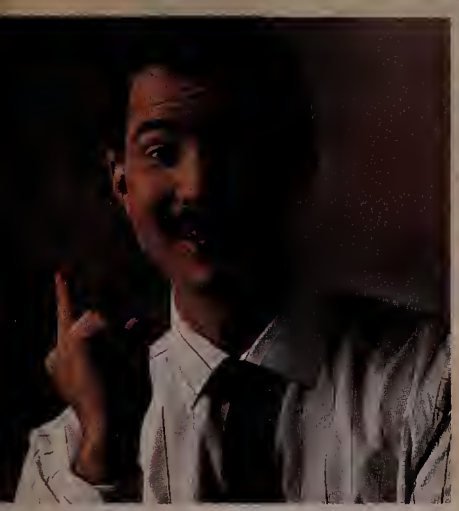
Have you bought shrink-wrapped software only to find that it's been used before? Send us a letter detailing your experience and we'll report back on our findings.

Nolo Comes Through

About two years ago I bought *WillMaker* from Nolo Press and drew up wills for my wife and me. There was a minor problem during printing, but I got involved in other things, intending to eventually request assistance from Nolo. About a month ago I finally wrote to them explaining the problem and asking if there was a fix.

Less than a week after I sent the letter, I received the most recent version of *WillMaker* by priority mail, along with a note apologizing for the delay in re-

"I haven't taken a LaserJet in for repairs once in seven years."



—Clyde Alpert, ARL Services Inc., Chicago, IL

"I repair other printers once, twice, maybe three times a year," says Clyde Alpert. "But I never have to take the LaserJets in. We've pumped thousands and thousands of copies through them, and they've never failed us."

In addition to great reliability, HP also offers exceptional customer support. For example, the LaserJet Customer Assist Line is staffed with experts to advise you after the sale. They'll help you take full advantage of all the HP LaserJet printers' unique features and answer your hardware and software questions.

With five award-winning models, ranging in price from $1,249 to $5,495,* HP offers an unbeatable selection. You can also choose genuine PCL5 printer language, with scalable typefaces. As well as HP's exclusive Resolution Enhancement technology, which creates sharper edges and better overall print quality.

To hear more about what other customers have to say about HP LaserJet printers, remember to call **1-800-752-0900, Ext. 2986** for a free video. Then forget about repairs.

HP LaserJet Printers.

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Circle 33 on reader service card

sponding to my problem. The new program worked perfectly, and our wills were finished the same day I received the program. Nolo Press's quick response went above and beyond what could reasonably be expected.

PHIL BRIND'AMOUR
PITTSBURGH, PENNSYLVANIA

The Case of the Missing Drive

I recently ordered a hard drive from MCS Computers in Rochester, New York, which advertised in your November issue. MCS promptly charged my Visa account for the $155 purchase. Despite numerous assurances, I have received nothing. An MCS employee told me they shipped a total of four drives to me, one sent via "blue label," guaranteeing delivery within two days. I've received nothing, and the phone number listed in the ads has been disconnected.

RAY VOGELWEID
OMAHA, NEBRASKA

Editor's note: Consumer Watch *received three letters from MCS customers who paid for items they never received. We contacted the Better Business Bureau in Rochester and the Attorney General's office for the State of New York, but neither had information about the now defunct company.*

We've sent our files to the State Attorney General's office and the U.S. Postal Inspector. We encourage MCS customers who've had similar experiences to contact Consumer Watch.

Think you've gotten a raw deal—or a great one? Mail the details to Consumer Watch, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Consumer Watch; MCI Mail, PC World Editorial; CompuServe, 74055,412; 415/442-1891 (fax). We'll investigate complaints and publish letters with the broadest interest.*

Christina Wood provided research assistance.

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PC MAGAZINE EDITORS' CHOICE December 17, 1991 Generic CADD Version 5.0

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POWER TIP NO. 251

Blanking Lines in dBASE

Do you sometimes scroll back through *dBASE*'s dot command buffer to bring up an old command and then realize that you need to type a new one in its place? Just press **<Ctrl>-Y** to delete everything from the cursor to the end of the line.

Iftikhar Ahmed Khan
Karachi, Pakistan

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ROLL OVER,

"The Birth of Venus." Sandro Botticelli, Italy. About 1480. Oil on canvas, 5' 8⅞" x 9' 1⅞".

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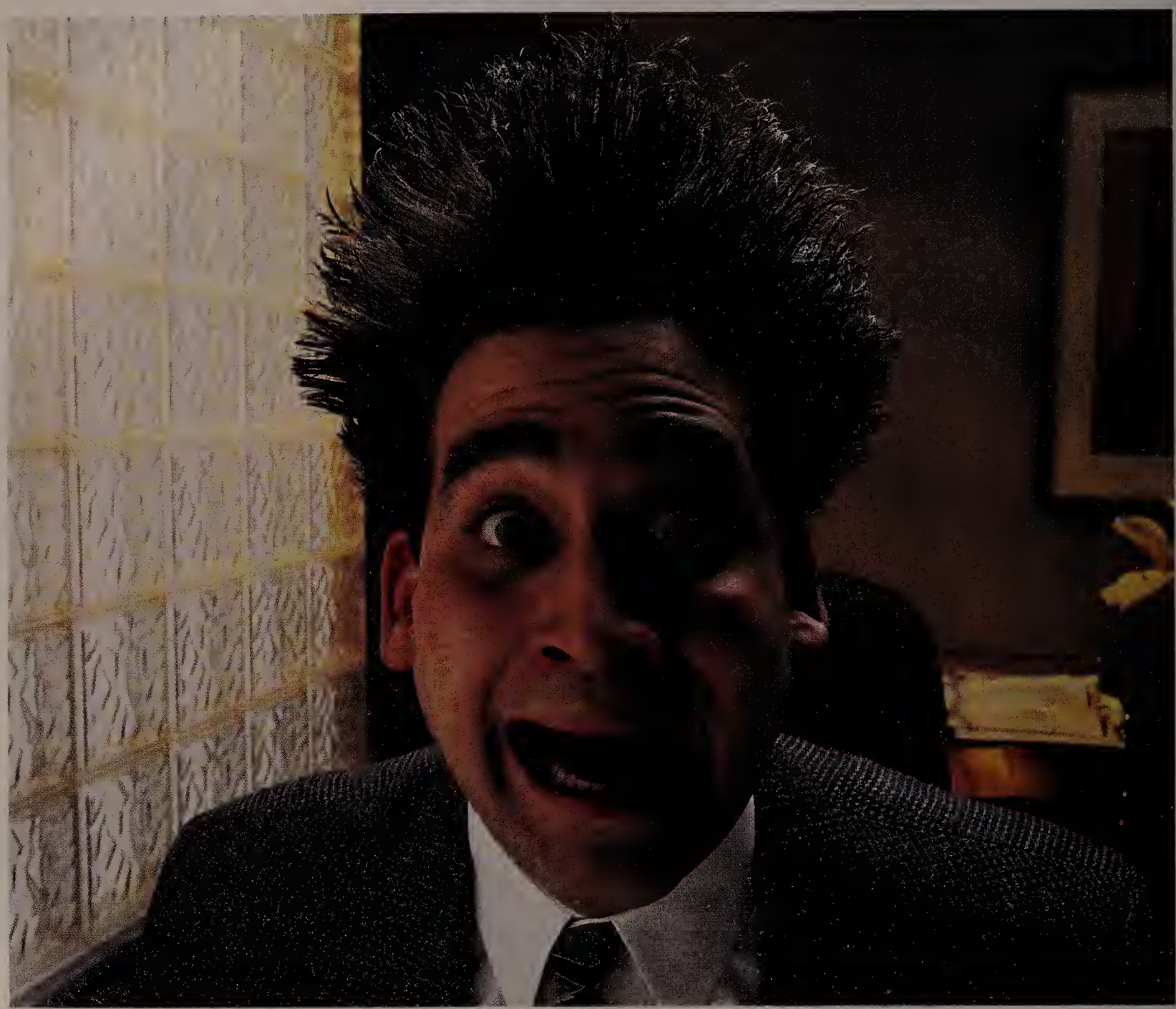

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Circle 265 on reader service card

WHAT ? NEXT

By MIKE HOGAN

I Am a Weak Man

Dangle a new graphics program in front of me. Watch me bite, disk space or no.

MICHAEL LLEWELLYN

My life was simpler in the early eighties before the PC industry got control of my checkbook and my soul.

It took years for my character-based apps to overcome my kilobyte-pinching on my XT's 10MB hard drive. But six months after I got my mainframe substitute, I'm wondering where its 100MB of disk went. The answer is, to graphics.

I used to think oversize apps and files could only happen to desktop publishers, graphic artists, maybe *dBASE* users. But now that I've welcomed *Windows* onto my hard drive, I know what it's like to consume conspicuously.

"Don't worry about app and file size," *Windows'* dad assures us. "The per-megabyte price of Winchester drives is in a free-fall." He's right—mostly. So why don't I feel like I'm winning the space race?

Well, because hard drives don't really get cheaper; they just get bigger. The $350 that bought me an extra 40MB a couple of years ago buys me 80MB today. But I still can't afford that, and I'd be nuts to fill up a bay with a 40MB drive.

Anyway, buying more hardware won't solve my problem because *Windows'* dad, his army of programmers, and all their programming buddies know about cheap disks. They use them as the excuse to write bigger, cooler apps. Remember when *Quattro Pro* was a cute little spreadsheet that could fit on a laptop floppy? Now it should join Philippe on his jogs.

Okay, it's not all programmers' fault. I happen to have a low resistance to spreadsheet fonts, color clip art, thesauruses, and *Windows* games. If I didn't know better, I'd swear the BMP files from my three screen-saver utilities have been breeding at night.

I'll never get ahead, but data compression—real-time data compression to be precise—lets me stay even. Spend $110 for AdStor's *SuperStor* or Stac Electronics' *Stacker*, and double the space on your hard disk—without dropping a single screw down a card slot. Your 40MB hard drive grows into 80MB worth of elbowroom. An 80MB drive turns into 160MB; same price, more value.

Real-time compressors work in the background to unsqueeze files as quickly as you can type file names. Installation takes under an hour, depending on the number of files you have to compress initially. No fuss, no static shock, no days with a disassembled computer before finding out about the typo in the hardware manual's jumper settings. The best part is that you feel like you're getting something for nothing—or next to nothing—for doing nothing—or next to nothing.

The catch? This deal won't last forever. Right now we're in one of those periods before a technology is widely adopted—like the PC in the seventies—when you can get an edge. Once programmers can rely upon a majority of users having double the disk space, forget it. *SuperStor* already ships on DR DOS disks, and *Stacker* will be given to 300,000 OS/2 2.0 beta testers to soften OS/2's 30MB bite.

I don't know the ultimate answer. I'm happy just to get 200MB of storage in time to add sound, animation, and a whole bunch of new 300K BMP files to my favorite *Windows 3.1* application, turning my screen into a Van Go-away.

WHAT TO WATCH

Dell plans a feather-light (3.5-pound), notepad-thin (1.25-inch) **notebook** in June with a reflective display barely differentiable from backlit panels .... Affordable multimedia: **Digicom Systems** plans a fax/modem/audio/voice-compression (answering machine)/voice-recognition **half card** for June release at an insane sub-$200 price .... **ALR** joins the active-matrix color notebook fray in June, releasing its **Ranger M486C** for a very low price—$1000 above otherwise-identical monochrome models .... **Zenith Data's** new line of desktops planned for June will be equipped with **ethernet** and popular **network OS's** like its recent notebook introductions .... **AST's** summer release of a true **symmetrical multiprocessor** PC using the multithreading *Windows NT* (due for year-end) will let you spread your *PageMaker 4.0* project across four CPUs or run four apps simultaneously.

Questions? Contact me at 415/267-1718, 415/442-1891 (fax), PC World Online, or MCI Mail, 329-2648.

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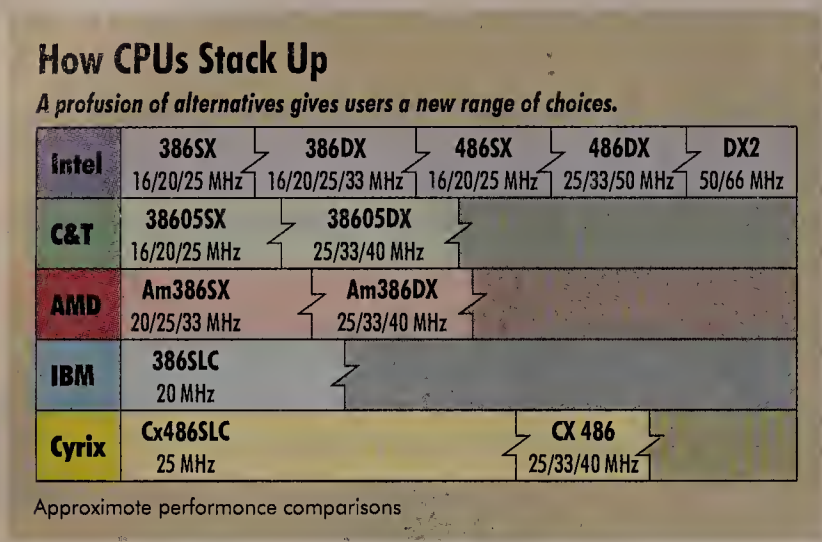
Edited by RUSSELL GLITMAN

PC Vendors Leap on Cyrix 486SX Clone

PC Brand, Zeos, and Tandon Among First to Use New Processor



The wide range of processors now available to vendors will continue to help drive PC and notebook prices down.

Just weeks after Cyrix announced its Cx486SLC, PC vendors were tumbling over each other to introduce desktop and notebook systems that feature the Richardson, Texas, chip maker's 486SX-compatible CPU.

Cyrix's Cx486SLC chip, available in 25-MHz clock speed, achieves about 95 percent of the speed of a 25-MHz 486SX but is tuned to actually outperform a 486SX in handwriting-recognition calculations and graphics manipulation. Cyrix promises to price the Cx486SLC at 386 levels, and since the chip can be plugged into a 16-pin 386SX socket, vendors can quickly roll out Cx486SLC systems based on current motherboard designs that offer better performance at a lower cost.

For example, Zeos International's first Cyrix-based desktop, which is scheduled to ship in early May, features a Cx486SLC/25 on a modified 386SX motherboard. Priced at $1995 (including 4MB of RAM and a 107MB hard drive), the system costs the same as Zeos's 386SX/20 desktop, says Zeos marketing vice president Rick Apple in St. Paul.

Preliminary 486SLC tests have shown "tremendous performance improvements" over a 386SX processor, Apple says. "Typically, we're getting results between an [Intel] 486SX/20 and a 486SX/25."

Concerned that users may doubt Cyrix's compatibility claims, Apple says Zeos will buy an Intel 486SX system for any of its Cx486SLC customers who experience compatibility problems with the "top 100 software applications" up to six months after purchase.

Positive Corporation, the Tandon-owned vendor that sells PCs with removable CPU cartridges via discount warehouses, is also introducing a Cx486SLC desktop. Notebook vendors moving to the Cyrix chip include PC Brand, which will sell a 6½-pound, $1995 486SLC notebook, and CompuAdd Express, the CompuAdd spin-off that specializes in low-cost systems.

Cyrix plans this summer to ship a full 32-bit chip that will run at 25, 33, and 40 MHz and upgrade 386DX machines to 486-level performance, according to the company. Cyrix is also developing a user upgradable retail version of the Cx486SLC to be used with 386SX machines.

—Jeff Bertolucci

Microsoft's NT Development Kit Moves Out

Microsoft plans to level a major barrier to its aggressive push for a year-end release of Windows NT by distributing the software development kit and beta versions of the operating system at the company's first NT developers conference in early July.

By demonstrating early third-party developer support for NT—more than 50 vendors showed NT applications at COMDEX Spring—Microsoft hopes to blunt IBM's efforts to promote OS/2 2.0. IBM's alternative began shipping in April and offers some of the same core features promised by NT, such as 32-bit performance and preemptive multitasking.

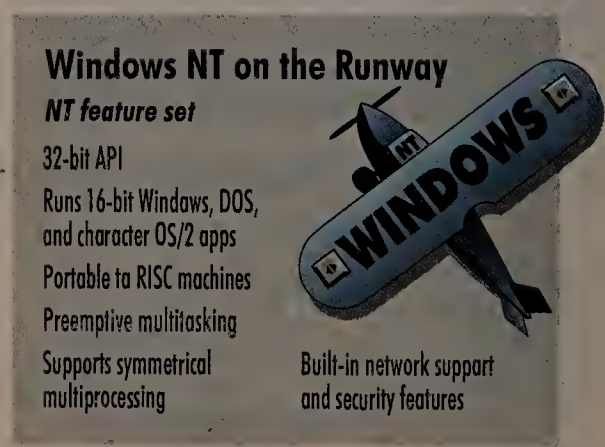
Windows NT, which incorporates the *Windows* interface and implements an extended version of the current *Windows* Application Programming Interface (API), is designed to one-up IBM's OS/2 2.0 by providing portability to RISC systems, support for symmetrical multiprocessing, integrated security features, and networking support, said company officials.

"If they get [Windows NT] out on time, it could be bad news for OS/2 2.0," noted Cheryl Currid, president of Houston-based consultant Currid & Co. "It will be better technically—better memory management, better use of the 32-bit environment—and supported by everybody."

The Windows NT development kit includes a beta copy of Windows NT and all the tools needed to develop 32-bit *Windows* applications that will run with Windows NT.

Like OS/2 version 2.0, Windows NT will run most "well-behaved" 16-bit DOS and *Windows* applications unmodified. It will also run 32-bit applications written to the Win32 API and 16-bit, character-based OS/2 applications, Microsoft officials claim.

The release will run on multiprocessor and single-processor 386 and 486 machines and on 32-bit RISC MIPS-based systems. *—Rob Garretson*



The next OS from Microsoft is due to ship by year's end. First beta copies go out in July.

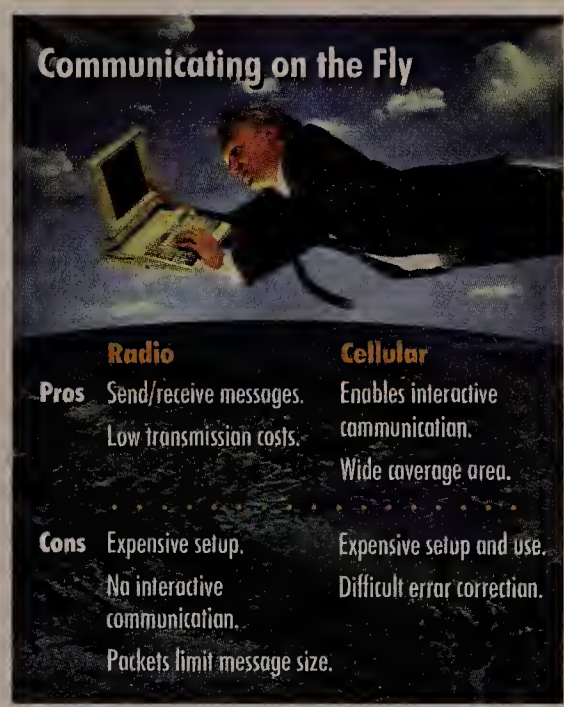
Notebook Communications A-Go-Go

A variety of wireless radio and cellular communications devices are hitting the market, giving notebook users new ways of keeping in touch with corporate data whether they're on the road, at the airport, or on a construction site.

Among the most innovative is Ericsson GE's Mobidem wireless radio modem, scheduled to ship in quantity this summer. This 1-pound, walkie-talkie–size device connects to a notebook's serial port (or to the communications port on the HP 95LX) and accesses RAM Mobile Data's Mobitex packet-switched network in order to exchange electronic mail and data.

With a list price of $1795, Mobidem is too expensive for the average business traveler, but its price is expected to drop below $1000 in 1993, according to Ericsson officials. Mobidem's initial success may also be limited by the Mobitex network's spotty coverage: Only 30 North American cities are included right now, but 100 cities should have coverage by the end of 1993, according to Ericsson officials.

Ardis, a joint venture of Motorola and IBM that uses a 400-city radio network originally set up for IBM field service technicians, plans to open the protocols to all vendors who want to sell Ardis-compatible radio modems. Meanwhile, Motorola announced plans to market radio modems for the competing Mobitex network in 1993.



New remote communications products let you stay in touch no matter where you go.

When shopping for wireless options, it's important to factor in line costs. According to the respective companies, Mobitex runs up to 25 cents per kilobyte, while Ardis is 80 cents per kilobyte.

—Jeff Bertolucci

Windows Ruling Favors Microsoft, Helps Borland

The greatest impact of Apple's defeat in its long-running *Windows* copyright battle with Microsoft may be felt by Borland and Lotus, which are waging a courtroom duel of their own.

That's the conclusion of leading intellectual-property attorneys, who contend that the mid-April ruling by U.S. District Court Judge Vaughn Walker is the latest in a series of findings that undermine Lotus's case by restricting the definition of what can be considered copyrightable. Lotus's suit charges that Borland's implementation of optional *1-2-3* command menus in *Quattro Pro* violates Lotus copyrights.

The surprise decision in the *Windows* case rips the heart out of Apple's $5.5 billion copyright and licensing infringement suit against Microsoft over the look and feel of *Windows*, but leaves numerous *Windows 3.0* issues, including the use of proportional fonts and the Program Manager display, unresolved.

Judge Walker found that Apple's use of icons and overlapping windows could not be copyrighted. He left alive the slim hope that infringement could still be found if the Apple look and feel was "not the necessary result of the grafting of the unprotectable elements onto the licensed look and feel of *Windows 1.0*."

"The way an icon looks might be protected, but the idea of using one to represent a program is not," explains Thomas Villeneuve, intellectual-property attorney with the San Francisco firm of Brobeck, Phleger and Harrison. "It's a restatement of traditional copyright law."

Walker's decision builds on a trend that includes a recent Federal Trade Commission requirement that, as a condition of its merger with Ashton Tate, Borland must not assert any copyright infringement claims against Fox Software that are based on command names, menu items, or command hierarchies. Villeneuve also cites the recent appellate ruling affirming a 1989 decision against Brown Bag Software in its copyright case versus Symantec over outlining software that functioned similarly. *—Russell Glitman*

PC Vendors Gird 586-Ready PCs

Faster than a speeding 486, more compatible than a RISC locomotive, and able to leap to multiprocessor systems in a single bound, Intel's next-generation 586 processor is expected to begin trickling out to PC suppliers in late summer. Code-named the P5, the 64-bit 586 will incorporate 3 million transistors (compared with 1.2 million in the 32-bit 486), run at 100 MIPS (about two-and-a-half times the speed of a 50-MHz 486), and provide extremely powerful floating-point performance.

Intel revealed little about the 586, and systems based on the new CPU won't ship in volume until 1993. But products such as Digital Equipment Corporation's new 486-based DECpc 400ST line already are promoted as "586-ready." Says DECpc product manager Michael Joyce, "When the 586 arrives, we'll put it on a processor card and you'll be able to install that in 15 minutes." The DECpc 400ST's starting list prices are $3000 for a 25-MHz 486SX, $3300 for a 33-MHz 486DX, and $4500 for a 50-MHz 486DX.

PCs with swappable processor cards such as the Compaq Deskpro/M and Dell PowerLine series will offer a similar upgrade path.

While vendors offer plug-and-play upgrades, it's not clear whether the 586 can take this approach. Instat analyst Dean McCarron speculates, "You'll be able to plug the first 586 configuration into that existing OverDrive socket." Other experts suggest that a new socket will be required for 586 versions with full 64-bit external data paths.

—Eric Bender

New ASTs Deliver Premium Power

Faster Windows graphics, EISA slots, and the ultimate in upgradable CPUs supercharge the talented new trio of systems from AST.

by Mike Hogan

You thought you had the ultimate power machine when you bought into 386 technology a couple of years back. Maybe you even opted for a little faster CPU and a little more disk than seemed necessary at the time.

But now that you have several *Windows* applications swapping to disk, you find yourself counting kilobytes, scanning mail-order prices for SIMMs, and trying to follow both your cursor and your spreadsheet numbers as they blink and wiggle their way across the screen. There's no doubt about it: *Windows* puts more strain on your system and your eyeballs.

AST's new Power Premium line aims to solve those problems with faster, higher-resolution graphics and flexibility in CPU and memory expansion that has been an AST hallmark as far back as 286 machines.

The Power Premiums are three new EISA-based platforms that upgrade easily from the 386-based 3/33 to the 486-based 4/33 or the 4/50d powered by Intel's 25/50-MHz clock doubler chip. Without junking your PC's old memory, you can just swap out the old processor card in exchange for a faster one.

Since AST's BIOS is in flash ROM, you can download new BIOS versions from AST's bulletin board and install them using software routines. You can also plug Intel's 33/66-MHz DX2 processor into the low-insertion force sockets of the 486s as soon as that chip becomes available.

Easy on the Eyes

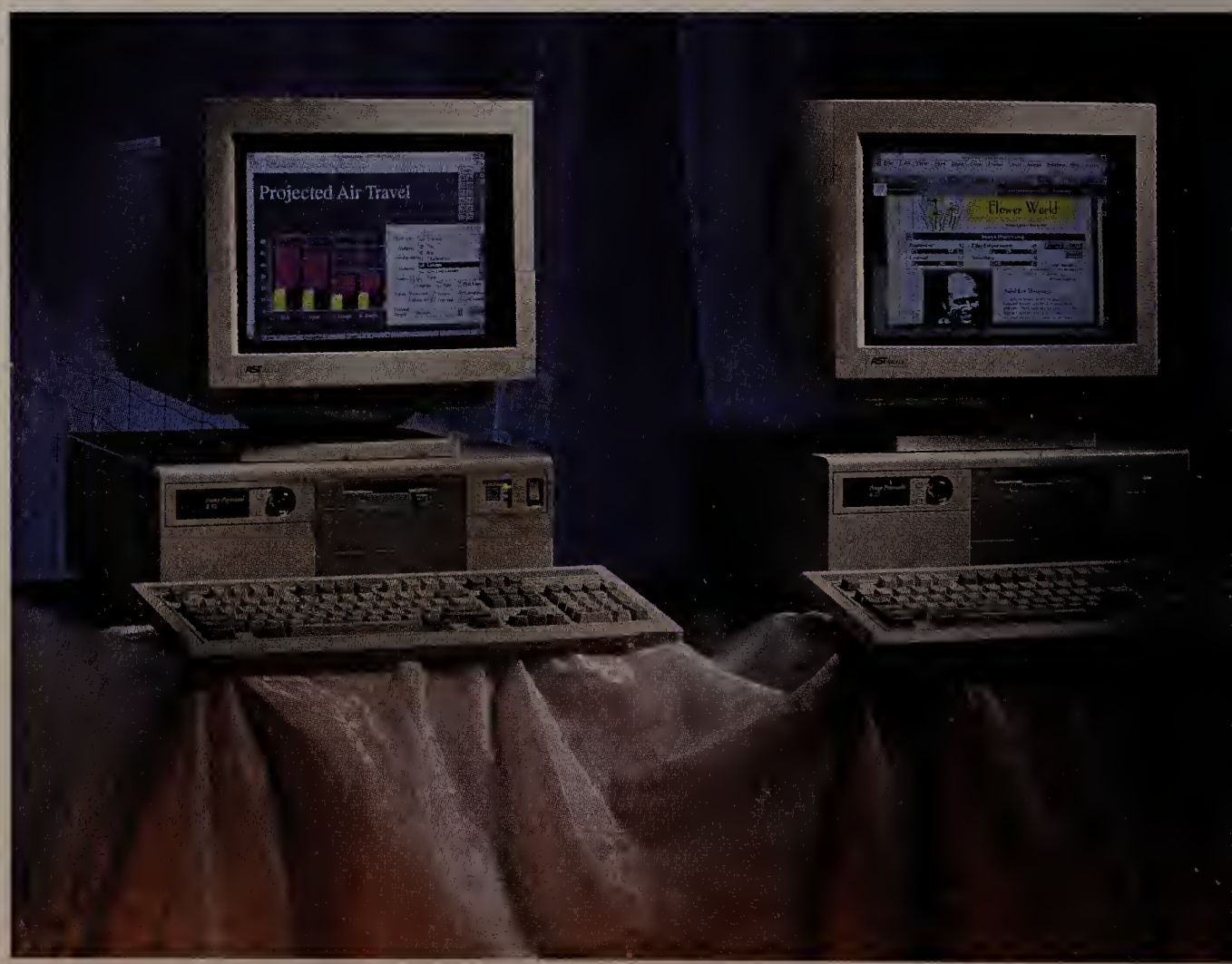
If you spend much time mousing around *Windows* or OS/2, you may already be considering one of the new bit-block transfer (BitBLT) boards that accelerate screen updates. They cost somewhere between $200 and $500.

You'll get that capability free with AST's Power Premiums: The Western Digital WD90C31 BitBLTer comes plugged into the motherboard. Spreadsheet columns don't wiggle, shimmy, or blink when you scroll a screenful. You spend less time watching the hourglass, and there's no more playing who's-got-the-cursor—the WD90C31 also refreshes the cursor so that your CPU doesn't have to split its time between doing that job and updating the screen.

Depending on the application function, the number of colors displayed, and your screen resolution, screen performance during graphics operations will improve an average of twentyfold over the VGA graphics available on AST's current high-end Premium II systems.

The Power Premiums' advanced super-VGA graphics controller also gives you more colors at higher resolutions than the five Premium IIs—the 386SX/20, 386/25, 386/33, 486SX/20, and 486/33, respectively—that are due to be phased out by the Power Premium line over time. (Expect to see new Power Premium versions announced in June that will fill out the low end of the line.)

With the basic 512K of DRAM, you'll see 16 colors at 1024 by 768 resolution or 256 colors at 800 by 600—both in noninterlaced mode. Spend another $50 to bring video memory to 1MB, and you can expect 256 colors at 1024 by 768 or a photo-realistic 32,000 colors at 800 by 600—again in noninterlaced mode. Finally, you can get 16 colors at 1280 by 1024 interlaced.



JOHN GREENLEIGH

Two new color monitors match the capabilities of the video adapter. The 14-inch and 17-inch AST Super VGA-LR monitors are low-radiation displays that support resolutions up to 1024 by 768 in noninterlaced mode at a frequency of 72 Hz or 1280 by 1024 in interlaced mode at 87 Hz. Noninterlaced mode minimizes screen flicker and thus puts less strain on the eyes.

Small but Expandable

Although they fill the same small-footprint platforms as the Premium IIs, each Power Premium offers five free 32-bit EISA expansion slots. Two of these EISA slots can be used to boost the Power Premium to 80MB worth of processor-speed memory. But you may not need them; any of the processor cards can be upgraded to 16MB worth of CPU-speed memory using 4MB SIMMs.

The base model hard drive—an 80MB IDE drive also from Western Digital—is a little on the small side for today's graphical environments (AST also offers a diskless model). A better choice is the 210MB model.

In any case, you'll find your PC's growth won't be stunted. There's plenty of room inside the Power Premiums for two hard drives as large as 500MB, and both of these drives can run off the same IDE controller to give you a total of 1GB of internal storage.

Another IDE adapter drives three externally accessible devices. The Power Premiums come with both 1.2MB and 1.44MB floppy drives. Adding a tape drive or even a CD ROM drive is as easy as sliding one in and plugging in the power and interface cables. AST's setup and configuration utilities automatically sense and configure your system.

The 145-watt power supply may sound a little light. But AST's long experience in building ASICs and integrating motherboard components has let it significantly reduce your system's component count, power drain, and heat generation. You'll have no problem getting along with a smaller power supply and fan that use less power, make less noise, and contribute to a smaller footprint.

A full complement of EISA slots is also far from common even in high-end boxes. But if you don't run EISA peripherals, don't worry about paying a premium for something you don't need. These days, EISA adds very little cost over ISA for a volume manufacturer like AST. AST's EISA slots run your ISA cards fine and give you the option of turning one of these power machines into a server later by adding, for example, a fast EISA-based token ring card.

And you will find these systems competitively priced. A fully configured 3/33 with a 14-inch monitor and the standard 80MB hard drive will cost about $3590; at the other end, its 4/50d counterpart with the same monitor but a 210MB hard drive will run you about $4690.

Subtract at least 30 percent from those figures for the street price, and you'll find you can get into a fast, GUI-tuned 386 with a smooth upgrade path to future CPU and storage options for $2500 or the top-of-the-line 486 for $3300. Those are prices hard for even mail order to beat. If you wish, you can get AST's truly *Windows*-friendly 17-inch monitor for about $700 over the price of the 14-inch.

Obviously, the Power Premiums will handle *Windows* or OS/2 today and leave you well positioned to tackle whatever surprises the software developers may have in store for you tomorrow. ●

Power Premiums are Windows tuned with fast processors, fast graphics, and 14- or 17-inch super-VGA monitors.

Mike Hogan is a senior editor for PC World.

SNAPSHOT

Power Premium 3/33, 4/33, 4/50d

A trio of new high-end systems from AST Research speed Windows graphics and give plenty of room for growth.

KEY FEATURES

- **Built-in BitBLTing and independent cursor refresh provide for fast Windows graphics**
- **Five available 32-bit EISA expansion slots, five drive bays**
- **Small footprint (15 by 16.5 by 6.25 inches)**
- **High-resolution 14-inch or 17-inch color or monochrome monitors**

AVAILABILITY

Immediate

PRICING

Power Premium 3/33 with floppy drive $2595, with 80MB hard drive $2995, with 210MB hard drive $3395; Power Premium 4/33 with floppy drive $2995, with 80MB hard drive $3395, with 210MB hard drive $3795; Power Premium 4/50d with floppy drive $3295, with 80MB hard drive $3695, with 210MB hard drive $4095; 14-inch Super VGA-LR monitor about $595, 17-inch Super VGA-LR monitor about $1295

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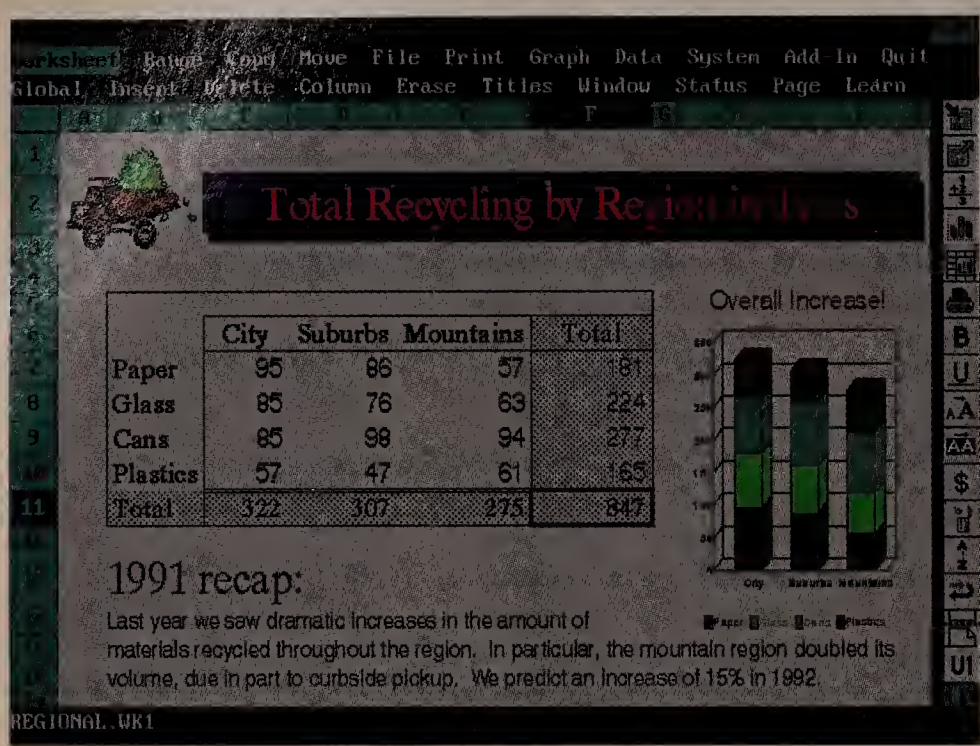
1-2-3 2.4 Gains Add-In Attractions

Still playing catch-up with Quattro Pro, Lotus's entry-level DOS spreadsheet adds a Backsolver, icon bar, and more flexible printing.



1-2-3 2.4's SmartIcon palettes provide quick access to frequently used functions, although they're not as fully integrated as in 1-2-3 for Windows.

by Rob Garretson

Spreadsheet technology is on the march. So far this year we've seen Microsoft's *Excel 4.0*, the premier graphical spreadsheet, and Borland's *Quattro Pro 4.0*, arguably the slickest product for the silent majority of DOS-bound users. Now Lotus is releasing the first of two *1-2-3* upgrades for DOS users—version 2.4, designed to run on PCs with 1MB of memory or less.

Lotus's release does not raise the bar of spreadsheet technology; it simply clears the existing one by a few more inches. Release 2.4 sports a limited implementation of the SmartIcons found in *1-2-3 for Windows* and a multivariable version of the Backsolver in *1-2-3 3.x*. Both are add-ins, like the Wysiwyg mode, Auditor, and File Viewer that arrived in *2.3*. All can now be automatically attached at start-up.

Additionally, release 2.4 boasts drivers for more than 60 new printers, improved speed and print quality for many supported printers, and landscape printing for dot matrix printers as well as LaserJets. These printing enhancements and SmartIcons will also show up in a speedier *1-2-3 3.4*, due this summer.

Goal-Seeking Solutions

Since Lotus plans a more significant graphical overhaul for both the *2.x* and *3.x* products in the fall, when the *2.x* line will also gain multifile capability, you may want to skip the hassle of this upgrade if you don't want the Backsolver.

The Backsolver simplifies what-if analysis by letting you specify a target value—your goal—for a formula, then calculate the values of one or more variables in order to achieve that result. (For multivariable analysis in *1-2-3 3.1*, you must use the Solver add-in.)

To solve a what-if problem, you simply invoke Backsolver, which takes between 40K and 45K of memory; specify the cell containing the formula you want to solve; enter the value you want the formula to return; specify the cell or range that contains the variables you want Backsolver to adjust; then select *Solve*. Backsolver will overwrite the original values with its solution, so unless you have the Undo feature enabled, be sure to save your original worksheet before playing what-if, or use Backsolver on a copy of your original.

Semi-SmartIcons

While the Solver is a big plus, *1-2-3 2.4*'s SmartIcons are actually pretty dumb compared to icon palettes in *1-2-3 for Windows*, *Quattro Pro*, and *Excel*.

The SmartIcon palette, which runs vertically along the right-hand edge of the screen, saves keystrokes by encapsulating common functions into icons that can be launched by a single mouse-click or by selecting them from the keyboard. It provides 68 icons, including 12 that are user definable and can invoke macros. The first palette can be customized to include your most frequently used functions or macros. The total number of palettes and the number of icons per palette are determined by display resolution and whether you're in Wysiwig mode.

1-2-3 2.4's SmartIcons are static, unlike intelligent icon palettes in other products, which display only the appropriate functions based on the mode you're in. The selected palette remains the same regardless of mode, which is annoying when you click on icons that work only in Wysiwyg mode, for example.

Disk and memory requirements are not much greater for *2.4*: around 5MB of disk if you install everything, and 512K of memory for both Wysiwyg and SmartIcon add-ins.

SmartIcons can definitely speed your work if you're accustomed to using a mouse. But loyal *1-2-3* users who want a true graphical interface in DOS, or want multifile capability in a PC with less than 1MB of memory, must wait until Lotus delivers the major overhaul promised for the fall. ●

Rob Garretson is a contributing editor for PC World.

SNAPSHOT

1-2-3 2.4

Backsolver and SmartIcon add-ins provide analytical muscle and interface shortcuts for the world's most popular spreadsheet.

KEY FEATURES

- **Backsolver multivariable goal-seeking tool**
- **SmartIcon palettes for invoking common functions or macros**
- **Faster, better, and more flexible printing**

AVAILABILITY

Immediate

PRICING

$495, upgrade from version 2.3 within six months $49, all other upgrades $150

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55 Cambridge Pkwy.
Cambridge, MA 02142
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Reader service no. 798

Dell's Graphics Go Direct

With a high-speed graphics board that avoids the I/O bus bottleneck, Dell's 486 DX2 powerhouse makes Windows breathtakingly fast.

by Jeff Bertolucci

Dell Computer Corporation's 450DE/2 DGX was born to run graphics—it blazes through video-intensive applications like desktop publishing, sweeps through CAD renderings, and even makes *Windows* programs run as fast as they can. Indeed, watching the DGX load *Windows* in seconds and create complex graphs in an instant makes using a graphical user interface a pleasure. What? *Windows* slow?

This newest member of Dell's PowerLine family of EISA PCs features a "direct graphics" architecture that pumps out video as fast as the processor can handle it. Simply put, Dell's design combines a single full-length board with the PC's 486 DX2 dual-speed (25/50-MHz) microprocessor, secondary 128K RAM cache, 2MB video frame buffer, and additional support chips.

Dell claims that the 450DE/2 DGX runs *AutoCAD* at least 50 percent faster than comparable DX2 systems that have graphics boards based on Texas Instruments' 34020 chip. The company gives credit for much of the DGX's *Windows* and *AutoCAD* performance boost to DGX-specific drivers written for those programs.

Like its PowerLine siblings, the CPU sits on a board that plugs into a dedicated slot on the motherboard, which simplifies future upgrades, according to Dell. To combine the processor/graphics functions for the DGX, Dell engineers extended the processor board by 7 inches, added video functions, and designed it to plug into both the processor slot and the half-length EISA slot next to it. As a result, the 450DE/2 DGX has five available full-length EISA slots. Other PowerLine systems have six slots (one of which is half length).

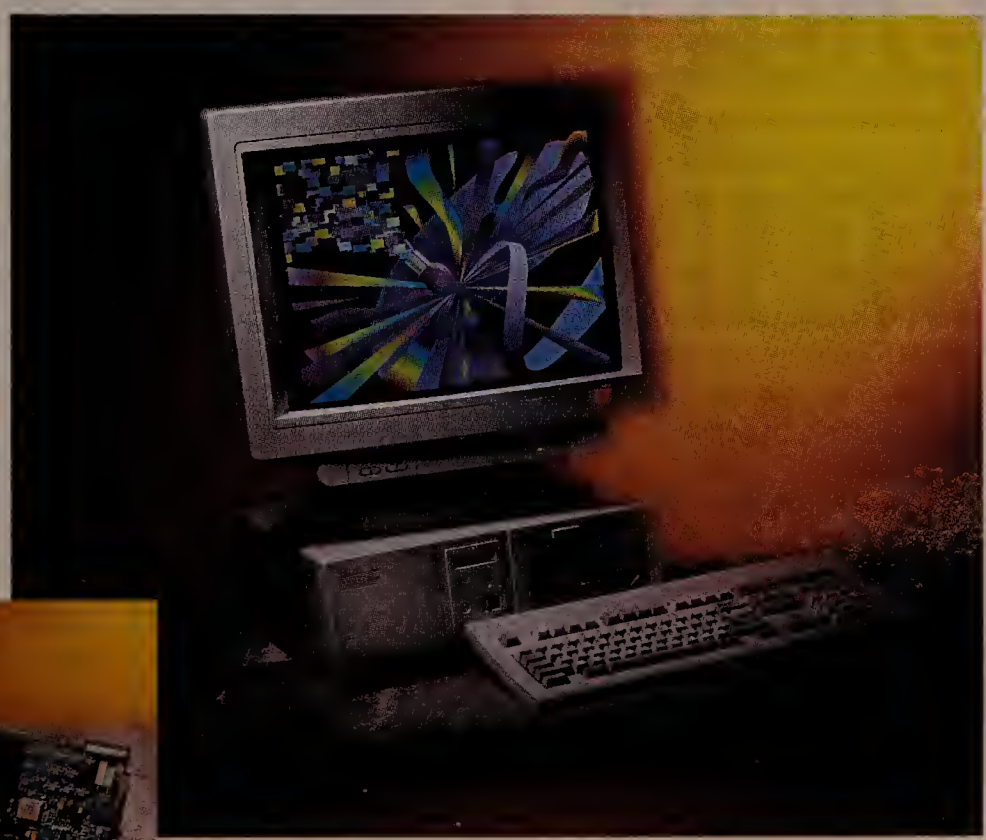
The local-bus design lets Dell's DGX bypass the I/O bus altogether and ship video data to the processor at CPU bus speed. Although the DGX system includes a high-speed EISA bus capable of transferring data as fast as 33MB per second, the 25-MHz CPU bus of the DX2 is actually faster for graphics because it doesn't bother with bus protocols and other data traffic.

To complement this high-speed graphics machine, Dell bundles an appealing 16-inch, high-resolution color monitor with the DGX. Essential for CAD and desktop publishing, Dell's monitor offers gorgeous color and crisp text at resolutions up to 1280 by 1024. The DGX supports as many as 64,000 colors—but only 256 colors at the maximum resolution. Similarly, the monitor offers an eye-pleasing 72-Hz refresh rate at lower resolutions, but only 60 Hz at 1280 by 1024. You can switch between a variety of resolutions and refresh rates.

All that power doesn't come cheap; the 450DE/2 DGX with an 80MB hard drive, a 3½- or 5¼-inch floppy, and 4MB of RAM (expandable to 96MB) lists for $5499. It retains the thoughtful design of the PowerLine family, including the whisper-quiet fan and the handy front-mounted power switch. The machine is compact enough (6 inches tall, 16 inches wide, and 16 inches deep) to fit on most desktops. (Dell also sells a PowerLine DX2 model without the direct graphics architecture or the secondary 128K RAM cache of the 450DE/2 DGX.)

The 25/50-MHz DGX flies: With its graphics processing pegged to the speed of the CPU, there's no faster way to run *Windows*. And if you need a graphics workstation built to handle heavy-duty graphics applications such as desktop publishing, CAD, or animation, the DGX is up to the task.

Jeff Bertolucci is an assistant editor for PC World.



ERNIE FRIEDLANDER

Dell's 450DE/2 DGX graphics workstation features an add-in processor card that includes Intel's 486 DX2 clock doubler chip and a graphics subsystem piloted by the CPU itself.

SNAPSHOT

Dell System 450DE/2 DGX

Dell's newest DX2 workstation features a cambinatian processor/graphics card to speed videa perfarmance.

KEY FEATURES

- **High speed graphics**
- **Removable processor card**
- **16-inch high-resolution color monitor**
- **Quiet operation, compact design**

AVAILABILITY

Immediate

PRICING

Starts at $5499

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An On-Line Window: Procomm Plus

Procomm is late to Windows but arrives dressed to the nines with power features and a snappy look that makes it easy to use.

Scroll bars and a search feature let you hunt through Procomm Plus for Windows' dialing directory in a snap. You can perform almost any task by selecting from the icon bar.

by Judy Heim

Not only is Datastorm's *Procomm Plus for Windows* a dream to use, it's also the most complete *Windows* communicator around.

Procomm Plus for Windows retains all the features of its DOS-based predecessor, *Procomm Plus*, and adds a new emulation (Vidtex) that rounds out an offering far greater than *Dynacomm*'s or *Crosstalk for Windows*'. All the main file transfer protocols are there, including ZMODEM with interrupt recovery, and you're more than likely to find your modem among the 200 drivers listed.

Procomm Plus for Windows is very flexible and customizable. For instance, unlike competing applications, which are typically session based (you have to load a session file before you dial), *Procomm Plus* provides a complete pop-up dialing directory, and you can adjust any entry setting on the spot. Moreover, you can convert your DOS *Procomm* directories and adjust everything from file protocol pacing to terminal-key mapping. If you're in a hurry, you can skip the directory and dial from a list of names that drops down from the icon bar; or you can dial by double-clicking an on-line service icon that you create in the *Procomm* program group.

On line, almost all tasks are accomplished by clicking icons at the top of the screen—uploading and downloading, capturing, printing, scrolling back the screen, and hanging up. You can program the 10 buttons along the bottom of the screen with 40 macros.

When a background file transfer finishes, the program conveniently beeps and displays a flashing icon at the bottom of the screen, even if you're working in another application. Cutting text from an on-line terminal screen and pasting it into a message is simple. You can also copy on-line screens or the contents of the scroll-back buffer into the *Windows* Clipboard.

As with *MicroCourier*, you can use your mouse to select on-line system prompts—just double-click on any on-line word or letter, and *Procomm* relays it to the system. Also, you can highlight any text, double-click, and *Procomm* uploads it.

Visual Script Writing

Procomm Plus for Windows' script language is a wonderful surprise. Not only does it support Dynamic Data Exchange (DDE), but it's more *Windows* attuned than even the *Windows*-oriented languages in *Microphone* and *DynaComm*. You can create *Windows* objects such as dialog boxes with a paint program (or select from Datastorm's sample objects) and use a visual dialog editor to drag and drop bit maps, hot spots, buttons, and any other *Windows* graphical object into your script.

Procomm was the one DOS program many *Windows* users held onto. With *Procomm Plus for Windows*, there's no longer any reason not to move all your applications into *Windows*.

Judy Heim is a contributing editor for PC World.

SNAPSHOT

Procomm Plus for Windows 1.0

WINDOWS Procomm brings its dialing directory and powerful features to Windows while delivering a fresh, new icon interface and a graphical script language.

KEY FEATURES

- **Object-oriented script language**
- **New icon-based interface**
- **Displays GIF file while downloading**

AVAILABILITY

Immediate

PRICING

$149

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314/443-3282
Reader service no. 830

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From The Company
That Printed
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Introducing six reasons why that leadership is sure to continue: the letter-quality Epson LQ-570, LQ-870, LQ-1070, LQ-1170, ActionPrinter™ 5000 and ActionPrinter 5500.

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For sheer paper handling flexibility, no other printer—dot matrix, ink jet or laser—handles quite as well as these.

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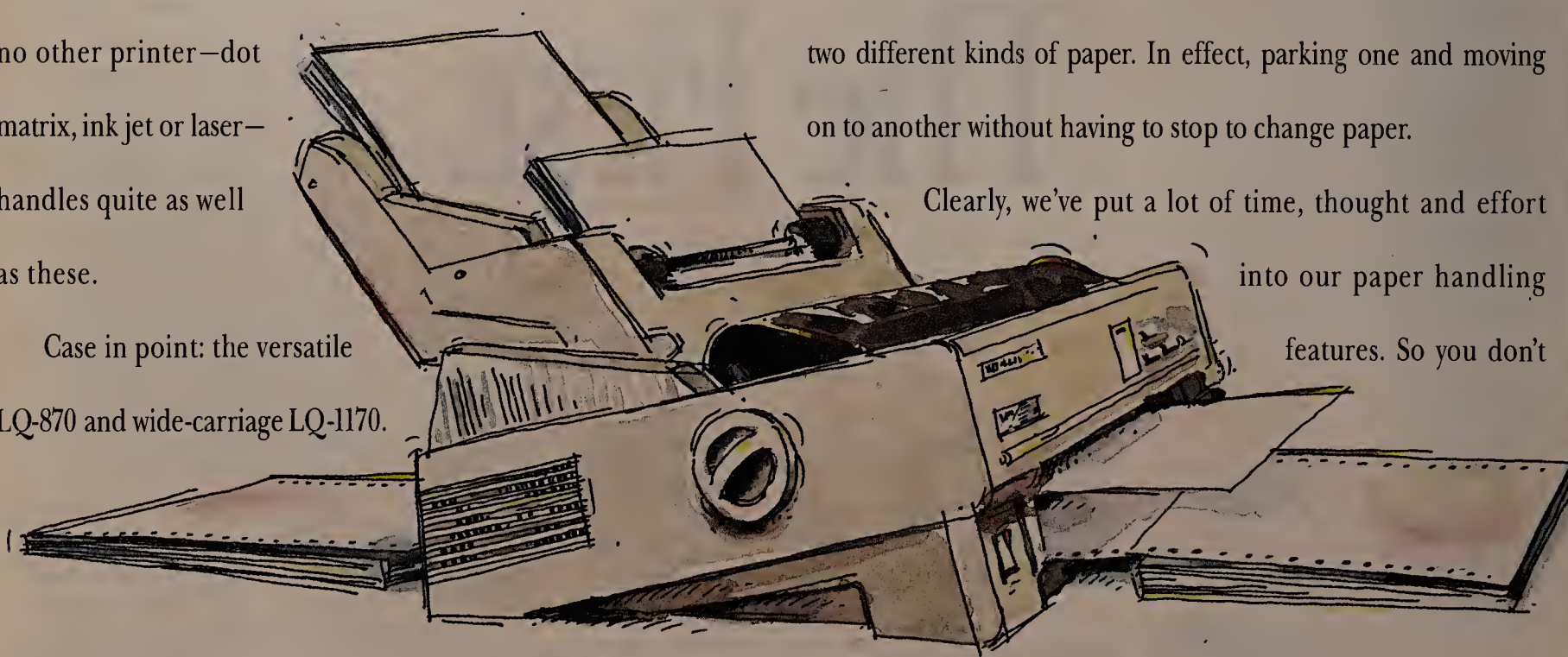

With five different paper paths to draw from at any moment, an Epson LQ printer is as versatile as it is dependable.

All company and/or product names are trademarks and/or registered trademarks of their respective manufacturers. ©1991 Epson America, Inc., 20770 Madrona Ave., Torrance, CA 90509. For dealer referral, call **800-BUY-EPSON** (800-289-3776). In Canada, call (416) 881-9955.

have to put much time, thought or effort into using them.

Scale New Heights.

Each new Epson printer comes with a new industry-setting standard—ESC/P2.™ This breakthrough printer control system brings scalable fonts to dot matrix printing.

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What ESC/P2 does for type, it also does for graphics. Brilliantly.

It includes an enhanced Windows™ driver, exclusive to Epson. When you print from any program running in Windows, you'll get superior output quality and faster throughput speeds.

sCALABLE FONTS

With a new Epson LQ printer, you can print a variety of type in a variety of sizes, up to 32 point.

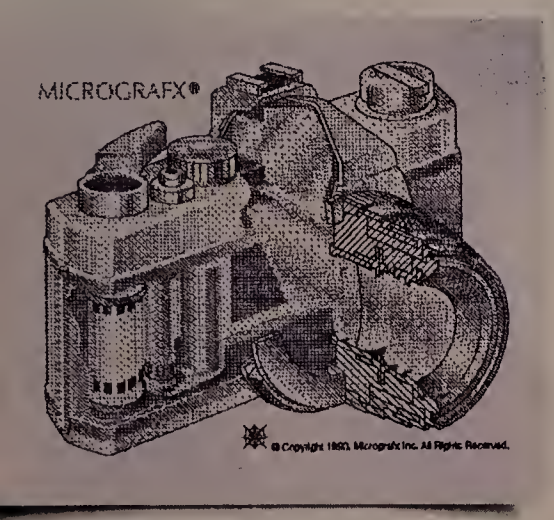
But don't just take our word for it. Take a look at the quality of our graphics instead.

Built For The Long Run.

Epson printers aren't only designed with more firsts, they're designed to last. Each is backed by a generous 2-year limited warranty. As well as a helpful toll-free 800 number to provide you with dependable, expert assistance.

One more thing you can always depend on: Epson reliability. It isn't a claim just any printer company can make. It's a quality—a character trait—our products have earned over time.

To see the latest printer innovations firsthand, visit your nearby Epson dealer, or call 800-289-3776. And see why, after more than 25 years, Epson is still the first name in dot matrix printing.



(Before.)

(Now.)

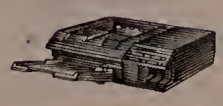
Epson's enhanced Windows driver improves not only the look of your text and graphics, but the speed at which they print.

EPSON

Desktops

Dot Matrix

Notebooks



Lasers

Servers

Norton Does a Desktop for DOS

This graphical DOS shell runs comfortably on XTs and 286s and combines the best of The Norton Utilities and Norton Commander.

by Reid Goldsborough

With *Norton Desktop for DOS,* you can replace your stark DOS prompt with a nifty front end to improve data access and file management as you pump up your system with a powerful suite of utilities.

With speedy character-based graphics that impart a GUI feel, *NDD* looks surprisingly similar to the popular *Norton Desktop for Windows.* It includes most of the data protection and system enhancement features of *The Norton Utilities* plus the file management and program launching capabilities of *Norton Commander.*

Like its *Windows* cousin, *NDD* includes an antivirus program, *Norton Antivirus,* which detects unknown viruses, and a backup utility, *Norton Backup*—two stand-alone programs not found in *The Norton Utilities* or *Norton Commander. NDD* also features a file uneraser (UnErase), disk diagnostics (Norton Disk Doctor), disk optimizer (Speed Disk), disk cache (Norton Cache), screen saver (Sleeper), and MCI Mail support (Norton Mail).

NDD may be the most attractive DOS shell out there. It displays drives as icons on the screen and has drop-down menus, dialog boxes, and resizable drive windows. You can navigate with the keyboard alone, but mousing around is often easier. The program conforms to IBM's CUA interface standard, which means that <F1> calls on-line help, <Alt>-<F4> exits the program, and so on. However, pressing <Esc> doesn't always back you out of a function—sometimes you have to press <Alt>-X.

There are a lot of things to like about *NDD.* The program is highly configurable—for instance, you can set up *NDD* to display abbreviated menus for novice users. You can add or delete any menu command and assign any a shortcut key. There's a button bar at the bottom of the screen for frequently used commands, which you can edit and assign to function keys. As with *Norton Commander,* you can opt to access the DOS prompt from within the program. Moreover, you can open as many as eight drive windows at a time for convenient file management.

NDD can automatically build a menu of commands to launch your applications, but it doesn't always guess correctly which program is associated with your executable files. Fortunately, you can edit the menus it creates or simply create your own.

NDD has a convenient way of handling files archived with the popular shareware program *PKZip,* using source code Symantec licensed from PKWare. You can compress a file or group of files into a Zip file by selecting a menu command, and you can decompress a Zip file the same way. Because the program displays Zip archives the same way it displays files in a subdirectory, you can easily add compressed files to a Zip file or selectively decompress individual files. You can't view text files within a Zip file, but Symantec hopes to add this feature to a future version of *Norton Desktop for DOS.*

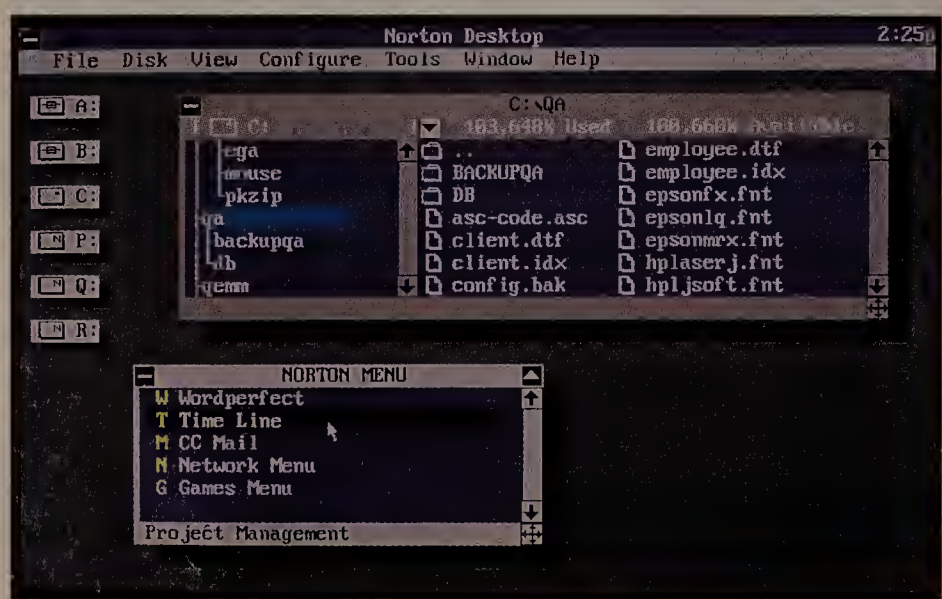
The application comes with more than 50 file viewers for word processor, data base, spreadsheet, and both bit-mapped and vector graphics formats. You can also view the names of the files contained in Zip, ARC, PAK, LHARC, ARG, and ZOO archives (although the program only lets you manipulate Zip archives).

NDD's screen saver is certainly its most fun feature. Walk away from your desk, and after a preselected time your screen turns into a colorful fish tank, a window to an intergalactic star fleet battle, or one of 22 other dynamic visuals. You can also password-protect access to your system using the screen saver. And if you have DOS 5.0 or a third-party memory manager, the screen saver loads automatically into upper memory.

NDD requires a minimum of 512K of RAM. When you launch other programs, *NDD* leaves behind a kernel of 2.5K in conventional memory.

With its more graphical interface and its added security and system enhancement features, *Norton Desktop for DOS* is a capable, easy-to-use DOS shell for a nontechnical or business user.

Reid Goldsborough is a Philadelphia-based computer consultant and journalist.



Norton Desktop for DOS includes a menu similar to the Windows Task List and a file management feature that mimics the Windows 3.1 interface.

SNAPSHOT

Norton Desktop 1.0 for DOS

This attractive DOS shell/utilities package is easy to use, with pulldown menus, dialog boxes, and resizable windows.

KEY FEATURES

- **Can open eight drive windows**
- **Convenient Zip file manager**
- **More than 50 file viewers**
- **Attractive screen saver with password protection**

AVAILABILITY

Immediate

PRICING

$179

Symantec Corp.
10201 Torre Ave.
Cupertino, CA 95014
800/441-7234,
408/253-9600

Reader service no. 795

THE SEARCH IS OVER...

As our story continues, we find Dakota Smith, dashing young scientist, and Lexa Kirk, independent journalist, nearing their destination. Both are searching for the secret source of the perfect portable PCs.

Holy

The Ultimate Notebook PC

Deep inside a mysterious cave, Dakota and Lexa discover three notebooks called the Nomad Series.

NOMAD They're Dakota's dream come true — notebooks designed for serious computing on the road, all with supernatural battery life, great screens and keyboards, in a compact, lightweight model.

Dakota can't help wondering how these astonishing little machines got here. "They must have been placed in the cave by some ancient civilization advanced beyond our time, or perhaps by beings from another galaxy," he surmises. Lexa, always probing for the truth, points out that the notebooks are clearly marked with the Gateway 2000 logo. Dakota is not satisfied. "Why would Gateway 2000 keep these wonderful notebooks hidden from the world?" he wonders.

"It must be a conspiracy!" Lexa exclaims. "An evil competitor must be behind this! The people at Gateway must have sent us the clues to discover their treasures so we could tell the world!"

"I think you're on to something, Lexa," Dakota agrees.

Cow!

's Are From Gateway 2000!

Dakota and Lexa — Gateway 2000 employees Phil and Mary — were photographed in Beautiful Rushmore Cave near Keystone in the Black Hills of South Dakota.

"Now it's our mission to tell the world about our discovery!"

Dakota pauses. In all the excitement, he has forgotten that Lexa's dream remains unfulfilled.

"I'm sorry, Lexa," Dakota tries to comfort her. "I know you were hoping to find something different — more like a cross between a notebook and a palmtop."

"You're right. These are excellent machines, but they're not quite what I was hoping for," she murmurs.

"But wait!" Dakota shouts, his voice echoing through the cave. "There's another map loaded on my Nomad. Yes, more directions. And the arrow is pointing to something called the HandBook. Do you suppose…?" he wonders.

Dakota and Lexa hurry out of the cave. What they thought was their journey's end has turned out to be just the beginning.

TO BE CONTINUED...

The Explorers' Notes

PC Magazine says, "Desktop PCs are faster (than notebooks)..." That was before we found the Nomads!

The **Nomad** notebooks we discovered are highly unusual. Our theory is they were designed to let you take desktop computer performance anywhere you go in a small, lightweight notebook. These systems are every bit as powerful as their desktop counterparts. And with patented power management features, the Nomads also have some hard-to-beat battery life benchmarks. We got almost seven hours of operation from a single battery on the 25MHz 486DX system. The Nomad power management system includes a 5.7 amp/hour battery and patented power-saving BIOS and software features.

The backlit, 10-inch VGA Nomad screens are bright and crisp. Resolution is 640 x 480, 64 gray scale, on the LCD. With 1MB video RAM, you can also display 1024 x 768 resolution on a monitor simultaneously.

There's another Nomad characteristic that sets these notebooks apart from most others. They're made in the U.S.A.!

NOMAD

- Weight 5.8 Lbs. (Nomad & Battery)
- Dimensions 8.5" x 11" x 1.8"
- 7-Hr.* NiCad 5.7Ah Battery
- 14.4-Oz. Battery Charger, 6.12" x 2.25" x 1.5"
- Traveling Weight 6.7 Lbs. (Nomad, Battery & Charger)
- Backlit 10" VGA Screen, 640 x 480 Resolution, 64 Gray Scale
- Simultaneous Video with 1MB
- 1.44MB 3.5" Diskette Drive
- 1 Parallel/1 Serial Port
- External Video & Expansion Bus Ports (Ports are Full Size)
- 79-Key Keyboard, 101-Key Emulation, Inverted T Cursor Pad
- Pointing Device
- MS DOS® 5.0 & Windows™ 3.1

Nomad Options: 2,400 bps and 9,600 bps modems, portable printer, numeric keypad, expansion station, Token Ring or Ethernet interfaces, SCSI interface, memory upgrades, executive carrying case, extra batteries

NOMAD 325SXL

- 25MHz, 386SXL Processor
- 2MB RAM
- 80MB Hard Drive

$1995

NOMAD 420SXL

- 20MHz, Intel® 486SX Processor
- 4MB RAM
- 80MB Hard Drive

$2795

NOMAD 425DXL

- 25MHz, Intel 486DX Processor
- 4MB RAM
- 120MB Hard Drive

$3495

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All prices and configurations are subject to change without notice. Prices do not include shipping.

** Battery life was measured using PC Magazine's Battery Rundown Test with power management enabled. Actual results may vary depending on configuration and applications.*

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Edited by RUSSELL GLITMAN

The New High End of Dell's PCs

These ISA and EISA 486 machines use Intel's new upgradable DX2 to boost performance as much as 50 percent over 33-MHz 486 PCs.

Priced at $2799 and featuring a compact, 4-inch-high chassis, the System 486P/50 is the least expensive of Dell's four new clock doubler DX2 PCs.

Dell Computer Corporation has jumped aboard Intel's speed-doubler bandwagon with four new upgradable ISA and EISA 486 PCs. Featuring Intel's dual-speed 25/50-MHz DX2 chip, Dell's new ISA and EISA systems are significantly faster than its former top-performing 33-MHz 486 machines, yet they cost only about $100 more. According to Dell, the new systems are up to 50 percent faster than the 33-MHz machines for some CPU-intensive applications, such as spreadsheets.

Just how much of a performance improvement you see will depend on your application. Intel's own processor-to-processor benchmark comparisons between its 33-MHz 486DX chip and the 50-MHz 486DX2 show a wide range of improvement—from as little as 7 percent for *dBASE IV* to 19 percent for *PageMaker 4.0 for Windows* and 25 percent for *Excel 3.0 for Windows*. Tests of 16-bit performance using the landmark CPU speed benchmark, however, showed a 49 percent performance gain by the DX2 over the 33-MHz 486. Performance gains are due to the capability of Intel's 50-MHz and soon-to-ship 66-MHz DX2 chips to execute instructions at twice the speed of the external 25-MHz and 33-MHz memory bus. This doubled internal clock rate enables the DX2 to race through processor-intensive tasks such as spreadsheet recalcs.

Dell's new DX2 line features two ISA systems, the 486P/50 and 486D/50, and two EISA units, the PowerLine 450DE/2 and PowerLine 450SE/2. Because each DX2 unit is upgradable, power junkies will be able to swap out the 25/50-MHz speed doubler for the faster 33/66-MHz chip when it becomes available.

The Dell System 486P/50 is the lowest-priced DX2 system and has the same compact, 4-inch-high chassis as the other members of Dell's System 486P line. Priced at $2799, the system comes with 4MB of RAM (expandable to 64MB), a 100MB hard drive, three ISA expansion slots, your choice of a 3½- or 5¼-inch floppy drive, and a VGA color monitor with 640 by 480 resolution.

Similarly configured, the new 486D/50 costs $3179, and its larger chassis and six ISA slots are designed for users with greater expansion needs.

Real power users will appreciate the two PowerLine DX2 models. In addition to the speed-doubler chip, the desktop 450DE/2 and floor-standing 450SE/2 feature the 32-bit EISA I/O bus for high-speed peripheral connections—perfect for LAN server and other high-I/O applications. Configured with 4MB of RAM, a 230MB hard drive, one floppy drive, and a color monitor, the PowerLine 450DE/2 and 450SE/2 cost $4599 and $6599, respectively.

You'll receive Dell's top-notch technical support, along with the option of buying the company's new Critical Care 4-hour on-site service. This innovative (and pricey) same-day-service program is available in 17 major U.S. metropolitan areas for $475 per year, per workstation.

The PowerLine 450DE/2 has a removable 4-by-6-inch processor board that plugs into a dedicated slot on the motherboard. This CPU board is designed to simplify upgrades to more powerful microprocessors as they become available.

This wave of DX2 PCs does not include specialized video subsystems, but Dell has introduced DX2 models with fast graphics capabilities that don't require a graphics coprocessor card, Dell officials say (see the preview "Dell's Graphics Go Direct"). —*Jeff Bertolucci*

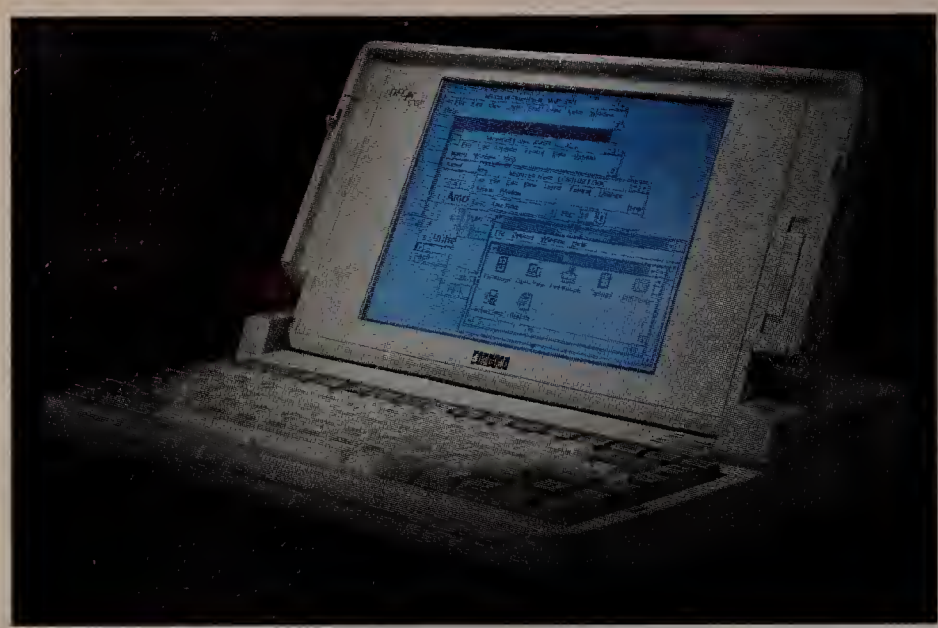
IN BRIEF

Dell System 486DX2 line

Four upgradable 486 PCs feature Intel's new 25/50-MHz DX2 microprocessor.

Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX 78759-7299
800/289-3355,
800/727-8320 (fax)
Reader service no. 630

A Notebook to Notice: Direct From DEC



DEC gets price wise: The company's new 6.4-pound, 20-MHz Notebook costs just $1995 when purchased through Digital's Desktop Direct catalog.

With the introduction earlier this year of its Desktop Direct mail-order PC operation, Digital Equipment Corporation joined the growing ranks of computer giants that have abandoned premium pricing. No product illustrates DEC's new strategy better than its new me-too 386SX notebook, priced under $2000 in Digital's Desktop Direct catalog.

Like IBM's latest notebook PC, the DECpc 320P Notebook breaks no new ground, except for its $1995 price ($3295 through traditional DEC channels). The 20-MHz, 6.4-pound unit is more than 1 inch longer and wider than today's trimmest notebook PCs and lacks several of the latest design innovations. Yet its mail-order price, which includes an internal 2400-baud modem, is almost unbeatable for a name-brand notebook. In addition, Digital is throwing in a Logitech portable trackball for a limited time.

The new DECpc 320P Notebook has all the features that have become standard on SX notebooks: 2MB of memory (expandable to 8MB), a 3½-inch floppy drive, a 40MB hard disk (or an optional 80MB disk), a backlit VGA LCD screen, a 3-hour battery pack, and the usual complement of I/O ports, including connectors for an external monitor and a keyboard.

The machine sports the auto-resume feature that's become standard on today's notebooks. This feature lets you turn off power to all system components except for memory without having to save data or exit applications. Up to four weeks later, you can resume operation, jumping into a document right where you left off. The DECpc 320P Notebook also comes with *Windows 3.0* preinstalled.

Built for DEC by Tandy, the unit has a solid, 84-key keyboard that includes dedicated cursor keys in the comfortable inverted-T arrangement. But the keyboard lacks some subtle advances found in other compact keyboards, such as extra space around the cursor keys that makes them easier to locate by touch.

The machine's crisp yet unspectacular LCD is also noticeably smaller than those on many competing notebooks, measuring less than 7 inches diagonally. The screen is large and bright enough to run *Windows* well, though it suffers from the submarining cursor effect common to notebooks. This phenomenon causes the cursor to disappear for an annoying instant or two when it's moved rapidly across the screen.

Despite a few blemishes and a lack of pizzazz, Digital's DECpc 320P Notebook is a solid performer at a competitive price. It's worth serious consideration from any notebook buyer on a tight budget.

—Rob Garretson

IN BRIEF

DECpc 320P Notebook

A capable if unspectacular 20-MHz 386SX notebook from a premium vendor, available at a rock-bottom $1995 price when purchased direct.

Digital Equipment Corp.
Desktop Direct from Digital
P.O. Box CS2008
Nashua, NH 03061-2008
800/722-9332,
800/524-5694 (fax)
Reader service no. 631

Tektronix Color Printer: An Office Attraction

The new Phaser II PXe thermal transfer color printer from Tektronix comes with Adobe PostScript and an astonishingly low $4995 price —a compelling argument for bringing color printing into the office.

Like the Brother HT-500PS and Seiko's Personal ColorPoint PS—Tektronix's competitors in the sub-$5000 color PostScript market—the II PXe is a 300-dpi printer designed for shared use. It comes equipped with 4MB of RAM (expandable to 8MB); parallel, serial, and AppleTalk ports; and an engine rated at 1 page per minute. You also get 17 Adobe fonts, which can be expanded to 39 if you buy an optional $595 font SIMM.

The II PXe also sports Adobe PostScript Level 2, which, among other improvements, promises better color handling than Level 1. Along with PostScript, the II PXe comes with Tektronix's Tek-Color PS color-matching software, which calibrates the colors on screen to match those on the page—a real help for designing and proofing jobs you'll send to a printer.

Five years ago, prices for color PostScript printers hovered in the general neighborhood of $25,000. Now, with prices as low as the Phaser II PXe's, high-quality color printers are becoming increasingly attractive for regular business use. Combine these appealingly low prices with the proliferation of color-capable business software, and it may be only a matter of time before thermal transfer printers break out of the graphics studio and into the office.

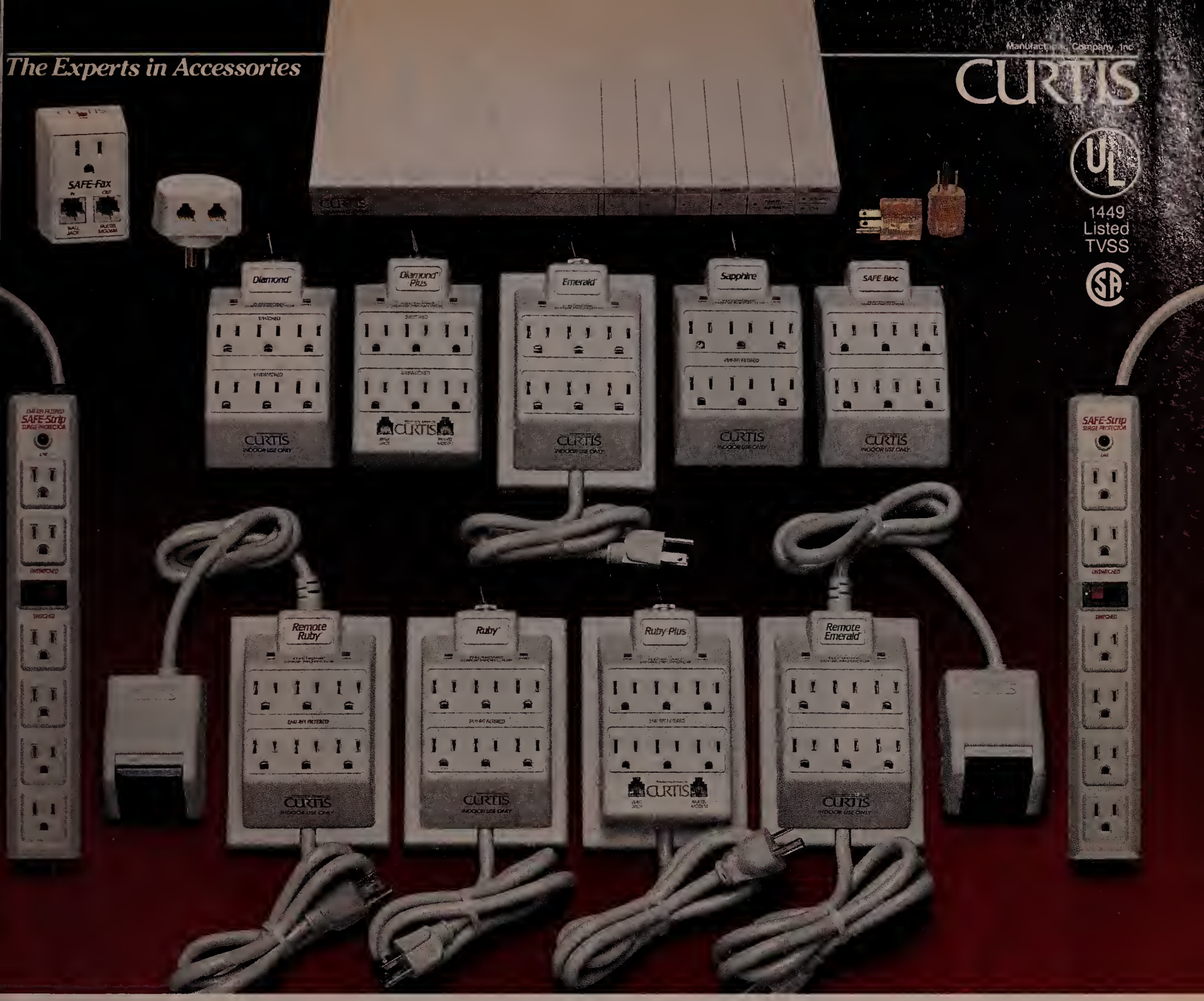
—Dan Miller

IN BRIEF

Phaser II PXe

The Phaser II PXe gives you high-quality thermal transfer color printing, screen-color matching, and Adobe PostScript for just $4995.

Tektronix Inc.
P.O. Box 1000, MS 63-583
Wilsonville, OR 97070
800/835-6100,
503/685-3063 (fax)
Reader service no. 632



You Can't Buy A Better Surge Protector Than Curtis

Guaranteed Protection—Proven Performance

When it comes to protecting their valuable data and electronic equipment, more computer users rely on Curtis surge suppressors than any other brand. Here's why:

UL 1449 TVSS Lowest Voltage Ratings—Every Curtis surge protector has achieved a rating of 400 volts peak or less—the lowest ratings available—in tests by Underwriters Laboratories for maximum let-through voltage.

Greater Selection—Single or multiple outlets, switched or unswitched, remote control, EMI-RFI filtering, phone line surge protection—choose the surge protector with the combination that best suits your needs.

Guaranteed Protection*—Every Curtis surge protector is guaranteed to provide you with the protection you need. And most are backed by the industry's best warranty coverage—the Curtis Lifetime Warranty.

With all this going for them, no wonder Curtis surge protectors are owned by more computer users than any other brand.

Curtis. You can't buy a better surge protector.

UL Standard 1449 TVSS tests the maximum voltage that can pass through a surge supressor after clamping has occurred.

LOWEST VOLTAGE RATING														HIGHEST VOLTAGE RATING
	330	400	500	600	800	1000	1200	1500	2000	2500	3000	4000	5000	6000

All Curtis Surge Protectors are rated at 330 or 400 Volts Peak the lowest ratings available.

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CURTIS

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*Surge protectors are not lightning arrestors and cannot be guaranteed to protect against direct hits.

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IBM's SX Alternative: The Sporty 386 SLC PS/2s

For a decade, IBM's cross-licensing deal with Intel, which gives it the right to produce or modify Intel CPUs, was little more than an insurance policy against periodic processor shortages.

Now IBM is leveraging that agreement into a formidable advantage over competing PC makers. For the first time, IBM is offering a high-powered custom 386 processor, the 386 SLC, in two new desktop PS/2 models.

IBM claims that when incorporated into the new PS/2 Models 56 SLC and 57 SLC, the 20-MHz SLC makes processing speed up to 88 percent faster than that of comparable 20-MHz 386SX systems—at street prices that should dip well below $2000 for some diskless models.

Other than the processor, the two SLC models are essentially the same as IBM's new upgradable PS/2 Model 56 SX, which replaces the best-selling PS/2 Model 55 SX, and the existing Model 57 SX, which accommodates the cached coprocessor option card containing the 20-MHz SLC.

IBM's new Model 56 SX, like the existing 20-MHz Model 57 SX, can accept IBM's cached processor option card containing the 20-MHz SLC. The SLC card also comes installed in the new Models 56 SLC and 57 SLC and plugs into the 56 SX and 57 SX motherboards.

IBM has shown that its design will accept more powerful versions of the custom CPU. These faster versions should be available in the fourth quarter and, IBM claims, will outpace a Compaq 25-MHz 486SX PC.

Like the existing Model 57 SX, the new PS/2 Models—the 56 SX, 56 SLC, and 57 SLC—all include 4MB of memory (expandable up to 16MB), a 2.88MB floppy drive, a SCSI port, and 16-bit VGA graphics on the motherboard.

IBM's PS/2 57 SLC features Big Blue's custom 386 SLC chip, which the company claims can greatly boost processing speed.

Priced the same as the discontinued Model 55 SX, the Model 56 SX has three MCA expansion slots and two storage bays and comes with either a 40MB hard disk ($2745 list) or an 80MB drive ($3030 list). The cached processor option lists for $780, with a street price of about $500.

The PS/2 Model 56 SLC is identical to the 56 SX model, except for the SLC processor—with 8K of internal cache—and comes with either an 80MB ($3560) or 160MB hard disk ($4030).

Diskless models of the 56 SX and 56 SLC list for $2445 and $2980, respectively, with Ethernet installed, and $2890 and $3420 for the token ring versions.

The PS/2 Model 57 SLC has five expansion slots and four storage bays. It lists for $3995 with the 80MB hard drive and $4465 with the 160MB drive.

—Rob Garretson

IN BRIEF

PS/2 Models 56 SX, 56 SLC, 57 SLC

IBM's new entry-level Micro Channel PS/2s are now faster, with more storage and an upgradable processor architecture.

IBM Corp.
1133 Westchester Ave.
White Plains, NY 10604
800/426-2468
Reader service no. 633

Overhaul That Old 286 PC

Perhaps the easiest—and the cheapest—way to upgrade your old 286 PC is to plug in a 386SX upgrade board.

But buying a complete system isn't the only way to get that performance gain. Microway, a leading upgrade board vendor, is shipping its FastCache-SXPlus/25, an AT bus expansion board that includes an AMD 25-MHz 386SX CPU and has room for 16MB RAM.

The FastCache-SXPlus/25 converts over 100 brands of IBM AT clones into 386SX PCs. The board includes a 16K cache and a coprocessor socket for an optional 25-MHz 387SX math chip. In addition, there are eight SIMM sockets for adding up to 16MB RAM (using 4MB SIMMs).

You plug the FastCache-SXPlus/25 into any AT bus slot and connect a cable that runs from the board into the 286 socket on the motherboard. You'll need to pull the 286 chip. In addition, because there are three types of 286 sockets, you'll need to specify which socket your system has when ordering. (Microway offers product information and phone support.)

Microway claims that the FastCache-SXPlus/25 can outperform most 20-MHz and 16-MHz 386SX systems. The board costs $595. Despite these performance claims, it's important to keep in mind that many complete 386SX systems cost just a few hundred dollars more than upgrade boards such as Microway's FastCache-SXPlus/25. Survey the field carefully before taking the upgrade leap. There's an abundance of choices.

—Jeff Bertolucci

IN BRIEF

FastCache-SXPlus/25

Microway's 25-MHz 386SX upgrade board turns a 286 PC into a 386SX.

Microway Inc.
P.O. Box 79
Kingston, MA 02364
508/746-7341,
508/746-4678 (fax)
Reader service no. 634

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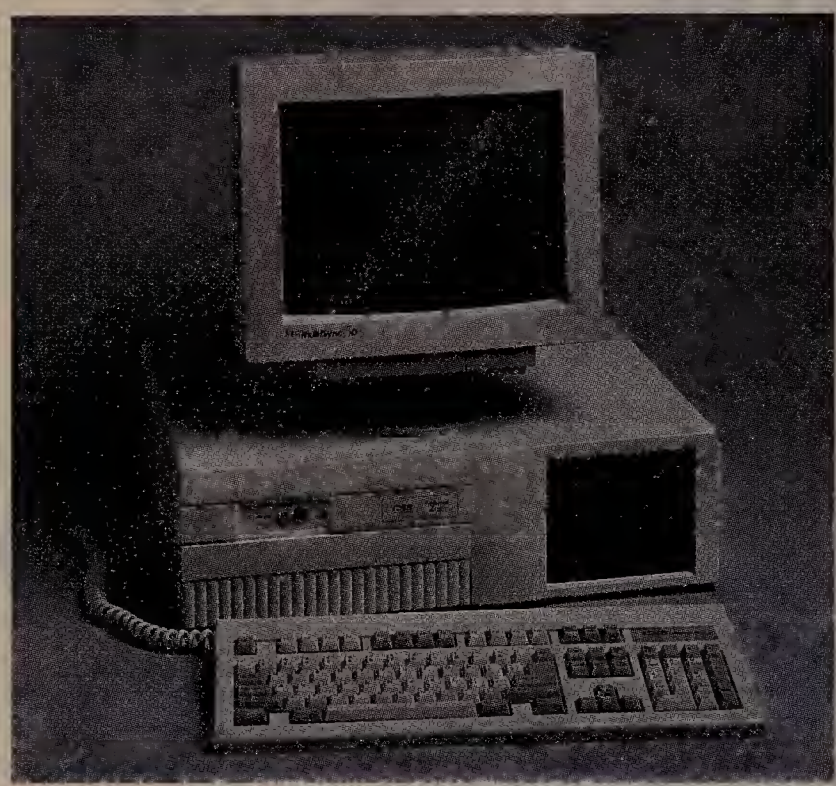
Circle 292 on reader service card

CSS Rides the Local Bus



The 32-bit slot in CSS's Preferred 433/GE (above) and 333/GA PCs holds the MaxGraphics board that speeds graphics performance.

CSS Laboratories is jumping on the local bus bandwagon with its new Preferred 33-MHz 386 and 486 PCs. These two new high-performance desktops use CSS's own local bus technology to boost performance of graphical programs such as *Windows* and *AutoCAD.*

The Preferred 333/GA and 433/GE PCs feature a unique 32-bit slot on the motherboard that's designed specifically for CSS's MaxGraphics/32 32-bit graphics board. Plug the MaxGraphics board into the local bus slot, and you'll get much higher data transfer rates—meaning better video performance. Whereas an ISA bus typically transfers data at the rate of 8 MHz, CSS claims its local bus can transfer data at 33 MHz (the speed of the CPU in both the 333/GA and 433/GE systems).

The Preferred 333/GA comes with a 33-MHz 386, 4MB of RAM, a 100MB IDE hard disk, a 1.2MB floppy drive, a 14-inch 1024 by 768 noninterlaced color monitor, a MaxGraphics/32 video board, seven ISA bus slots, DOS, *Windows,* and a keyboard for $2695.

In a similar configuration, the Preferred 433/GE, a 33-MHz 486 EISA desktop, costs $3895. The combination of the local bus slot and MaxGraphics/32 video board on the 433/GE offers faster graphics performance than an EISA video board running in a standard EISA bus slot, says CSS Laboratories.

CSS sells its Preferred PCs via resellers and its direct sales force. If your desktop's slow graphical performance is driving you to take unwanted trips to the water cooler, the local bus offerings from CSS are worth a closer look.

—Jeff Bertolucci

IN BRIEF

Preferred 333/GA, 433/GE

Two new desktop PCs from CSS Laboratories that feature a local bus architecture to speed graphical performance.

CSS Laboratories, Inc.
1641 McGaw Ave.
Irvine, CA 92714
800/966-2771,
800/837-2891
Reader service no. 635

Toshiba Doubles Your Drive

You no longer have to buy an IBM 386SX PS/2 to enjoy the double capacity of 2.88MB 3½-inch floppy drives. Thanks to Toshiba, you can upgrade your current PC with the new 2.88MB ND-3571 drive and take advantage of everything these larger-capacity drives offer, such as backups that require half the usual number of disks.

Toshiba uses media made of barium-ferrite and a new write/erase technique that allows the ND-3571 to store twice as much data in the same amount of space, while maintaining read/write compatibility with 1.44MB and 720K disks. So if you just want to add a 3½-inch drive, you can move up to the future standard while using the older, less expensive media. After all, the 2.88MB media is pricey, running about $6 each in five-packs for $30, but Toshiba expects the cost per MB to be competitive with 1.44MB disks within a year.

The 1-inch-high ND-3571 drive comes with a controller, a cable, and one disk. It carries a list price of $350.

—Rex Farrance

IN BRIEF

Toshiba ND-3571

This 2.88MB floppy drive also reads and writes 1.44MB and 720K disks.

Toshiba America Information Systems
Disk Products Division
9740 Irvine Blvd.
Irvine, CA 92718
714/583-3000
Reader service no. 636

Take Your Desktop With You

The SlimPro is a 2¼-inch-high 386SX PC that's small enough to fit on a cramped desktop, light enough to carry from office to home, and cheap enough to serve as a low-cost network node.

This tiny desktop unit has the same footprint as a standard-size color monitor, but you can carry its 8 pounds without straining a muscle. Just make sure a keyboard and monitor are waiting at your destination.

Light weight and a trim profile are good, but even better is the SlimPro's price. For $565 you get a 25-MHz AMD-386SX microprocessor, 1MB of RAM (expandable to 16MB), a 3½-inch floppy drive, a VGA graphics board, and one parallel and two serial ports. The external power supply connects to the PC via a cable and is designed to sit on the floor.

The unit has only two AT bus expansion slots, and one holds the VGA board. Prices vary by configuration. For example, a SlimPro 386SX with 4MB of RAM, 80MB hard drive, and 80-key minikeyboard costs $1160.

—Jeff Bertolucci

IN BRIEF

SlimPro

A tiny 386SX PC designed to work as a network node and in cramped offices.

AddTech Research Inc.
41332 Christy St.
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510/623-7538 (fax)
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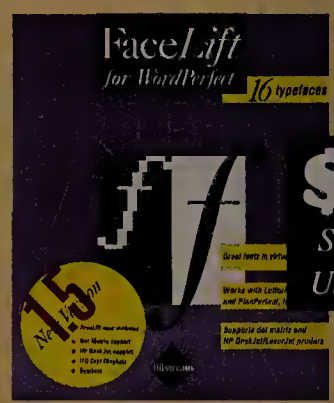

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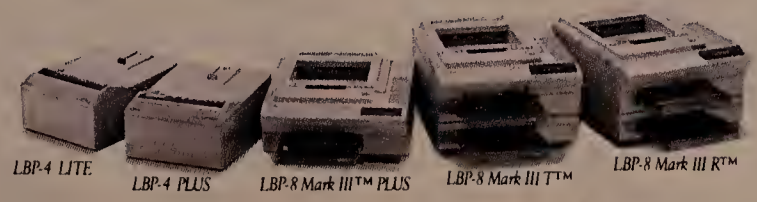

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Canon

Circle 50 on reader service card

Giving Windows Lots of Room

XSoft's unique Rooms for Windows cleans up Windows clutter and lets you organize your Windows desktop around the way you work.

Rooms for Windows' overview screen shows which programs are open in each application "room."

If you've tried to do any serious work in *Windows*, you've probably encountered *window glut*, a condition in which your *Windows* desktop accumulates overlapped windows the same way a cluttered desk accumulates papers. When you have so many windows open you can't find the one you need, you're bound to end up frustrated.

To the rescue comes *Rooms for Windows*, a product from Xerox's XSoft software subsidiary. This novel $99 *Windows* shell enables you to travel back and forth between separate *Windows* desktops, called *rooms*, containing the application windows pertinent to a particular task, client, or project.

There's also an *overview* screen (pictured) that serves as a directory to the suite of rooms in your system. This screen lets you see which applications are open in each room without having to enter it.

When you start *Rooms for Windows*, it remembers which applications are supposed to be open in each room and starts them all up with the appropriate data files. When you leave a room (by pressing hot keys or clicking on *door* icons), you can return to find everything exactly as you left it. You can turn a full-screen DOS application, running in a *Windows* DOS session, into a room as well.

At first glance, you might think you'd want to keep dozens of application windows open under *Rooms for Windows*, creating enough rooms to manage them all. However, limitations within *Windows* prevent this: Even when memory is plentiful, *Windows* runs out of system resources and can crash when you try to run more than about 30 applications simultaneously. To help you get to your data quickly without overloading *Windows*, *Rooms for Windows* allows you to create *buttons*—icons that invoke the application associated with a file. Buttons, like application windows, can be placed in individual rooms or in multiple rooms.

How do you get from room to room? One way is to go to the overview screen and select another room. But doing this each time you want to change rooms can be cumbersome, so *Rooms for Windows* also lets you create "secret passages" from one room to another—similar to those in the Parker Brothers game Clue. Once you've set up this facility, you can get where you're going fast by clicking on a door icon that bears the name of the destination room. Another nice touch: *Rooms for Windows* supplies an icon that, when clicked, returns you to the room you were in before you entered the current one. This feature is handy if you enter a room by mistake or if you want to pop into a room, perform a quick task, then return.

Rooms for Windows also allows you to keep a single window in more than one room at a time. For example, if you want a personal information manager to be available in more than one room, you can tell *Rooms for Windows* to make the application appear in as many rooms as you like. Or you can add it to a special *overlay* room and have it appear in every room automatically.

If you're an account manager with several sales representatives or an executive who juggles work for multiple clients, *Rooms for Windows* will let you set up a room for each and switch contexts instantly. If you're a network or MIS manager, you can keep your network-monitoring software in a control room and jump to it at the touch of a key. And if you like to play games, set up a game room; with a click of the mouse you can switch to a work room when the boss shows up. In short, there's no limit to the uses for this highly innovative product.

—*Brett Glass*

IN BRIEF

Rooms for Windows 1.0

WINDOWS A novel Windows shell that lets you organize Windows around tasks, clients, or projects.

XSoft
Division of Xerox Corp.
3400 Hillview Ave.
Palo Alto, CA 94303
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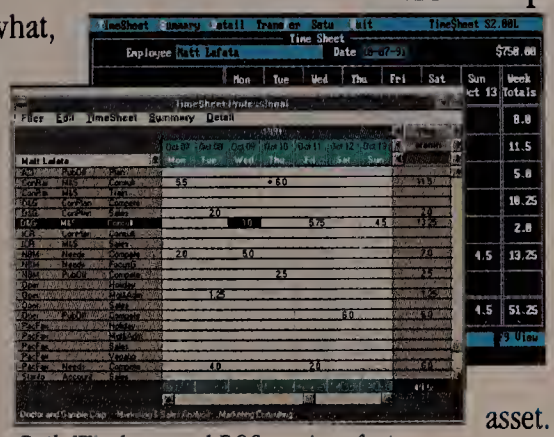

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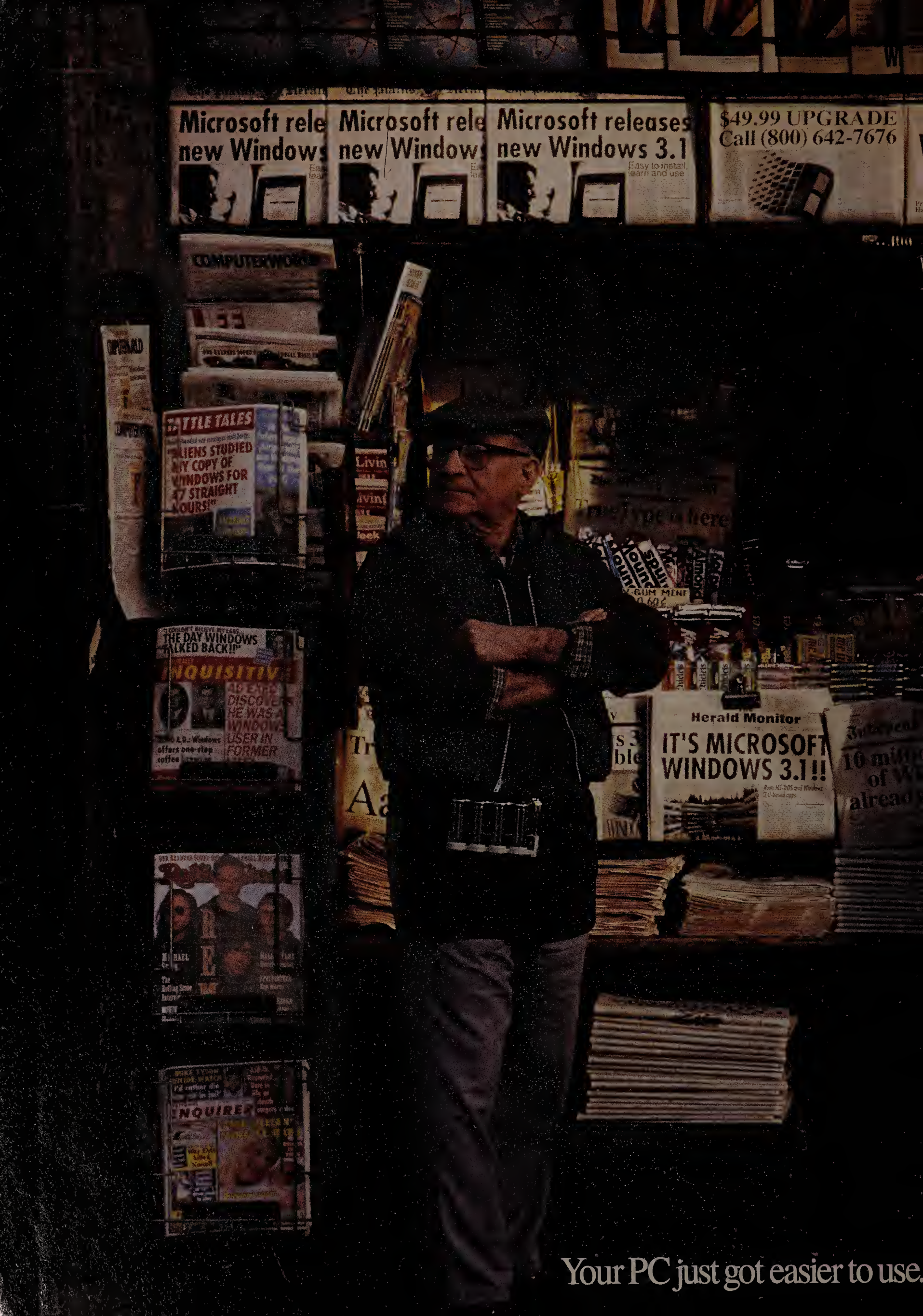

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(Inside scoop inside)

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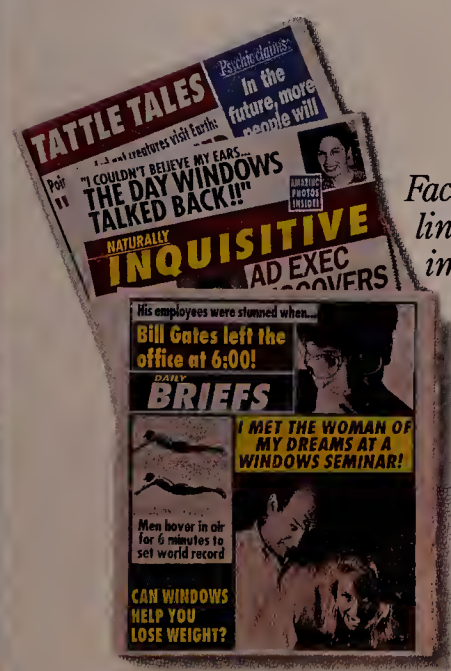

Fact: Windows 3.1 supports object linking and embedding (OLE), which improves the way your applications work together. And multimedia support lets you embed a voice note, music or sound effects into today's Windows-based applications, as well as run advanced multimedia applications. Mind-boggling but true.

*Special upgrade price of $49.99 is available only through 6/1/92. Offer good for current licensees of Windows only. Limit one upgrade p availability may vary. © 1992 Microsoft Corporation. All rights reserved. Printed in the USA. Offer good only in the 50 United Stat Canada, call (206) 936-8661. Microsoft and MS-DOS are registered trademarks and Windows and the Windows logo are trademarks. T

(Inside scoop inside)

Manage Contacts With Icon-Clicking Ease

With its *ACT for Windows*, Contact Software brings the popular DOS contact manager into the nineties and adds a suite of powerful new features, including integration with leading fax programs, *dBASE* support, and a versatile icon bar, that give users more flexibility.

The new fax management function links *ACT for Windows* to Delrina Technologies' *WinFax Pro* and *Faxit for Windows*. You can connect from within *ACT for Windows'* word processor, which automatically retrieves your contact's fax number and sends your document.

Listing for $495, *ACT for Windows* uses a standard *dBASE* file format for its contact data base, so you can easily integrate *ACT for Windows* files with any other program that reads *dBASE* files. You can create as many data bases as you need to keep track of your contacts and clients. And there's no limit to the size.

The heart of any contact management software is its contact cards. *ACT for Windows* provides 15 user-definable fields on its cards. What's more, each card is linked to the program's calendar—just select a card to get a complete list of activities for that contact. Or you can choose the activity list from the View menu to call up a list of all activities connected to that contact. Or you can choose a date in the calendar to bring up the activity list for that day. One drawback: You can't select an event in the contact card and zoom to that calendar date.

To speed your way through scheduling and follow-up tasks, *ACT for Windows* comes with a floating icon bar that has 20 assigned functions for your most frequent tasks, such scheduling a call or meetin writing a letter, or accessi the activity list. You can add subtract icons for 30 oth functions that come bundl with the program, or crea your own.

Like its DOS predecess *ACT 2.1*, the *Windows* versi lets you create your own po up menus. Unlike the DOS ve sion, there's no limit to t options you can include those customizable menus.

—*Melissa R. Riofi*

The popular DOS contact manager comes to Windows. You can modify activities directly from the calendar or from contact cards.

IN BRIEF

ACT for Windows 1.0

WINDOWS ACT for Windows improves on its DOS-based predecessor with a standard dBASE format and a host of graphical advantages.

Contact Software Int'l
1840 Hutton Dr. #200
Carrollton, TX 75006
800/365-0606,
214/919-9500
Reader service no. 639

Time Line Does Windows Project Management

The times they are a-changin' in the world of project management. Once considered too difficult and obscure for general business use, many packages are now as inexpensive and almost as easy to use as a spreadsheet, and companies are using them to reap big cost savings.

While lacking some of the features of Microsoft's hit, *Project 3.0*, Symantec's newest entry, *Time Line 1.0 for Windows*, is an elegant project manager combining the power of *Time Line 5.0* with the simplicity of *On Target 1.0*. In some instances, Symantec goes to the head of the class with a few innovative tools.

Time Line for Windows is easy to use, with a familiar spreadsheet interface. The icon bar is nonconfigurable, but it lets you perform most common functions at the click of a button. An innovative Co-pilot feature acts as a coach, matching your choices against internal rules and prompting you as you go. In *Windows*, the familiar drawing tool–like connector and a click-and-drag feature from *Time Line*'s earlier versions make it easy to set up relationships between tasks or assign resources. The built-in outliner hides an unlimited number of outline levels.

The project management engine is speedy and handles as many as 8000 tasks per schedule. You can set up individual resource calendars for every person on your project team or link these calendars together. While lacking DDE, the product does come with an OLE feature. A new Format Highlights option lets you set rules that are "almost critical" or define what constitutes a milestone, and an AND/OR option helps you resolve conflicts in resource availability.

You can get multiple simultaneous views on a project and minimize them into icons for later reference. After you spiff up your charts with special fonts, colors, or graphics symbols, the WYSIWYG print preview lets you see everything at once or scale your report to fit a single page. You can choose Gantt, PERT, spreadsheet, or monthly calendar report formats, or customize your own.

Time Line for Windows $699, but *Time Line* users c get it for $179, and *On Tar* users for $199. The compe tive upgrade price is $1 Each simultaneous LAN no costs $599. —*Bronwyn Fry*

IN BRIEF

Time Line 1.0 for Windows

WINDOWS This Windows-based project management system is easy to learn and use yet powerful enough to handle complex projects.

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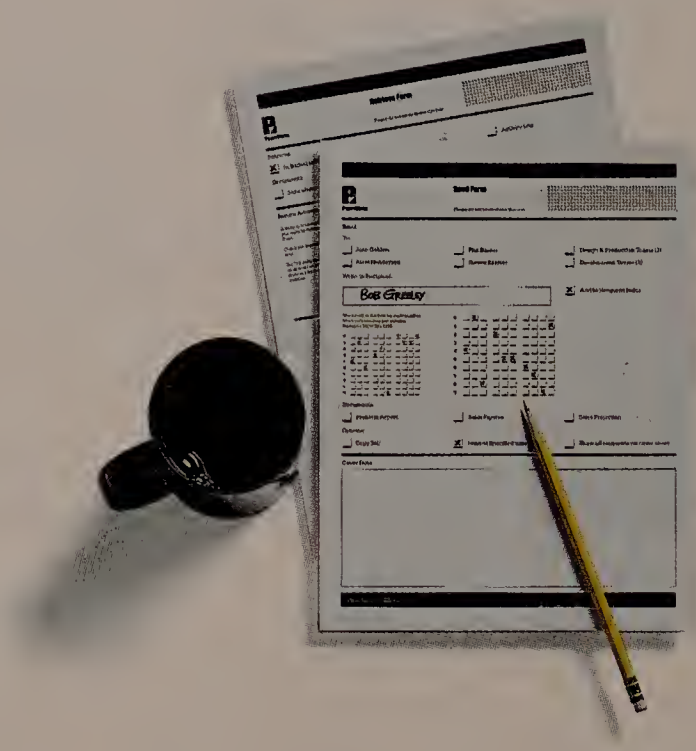

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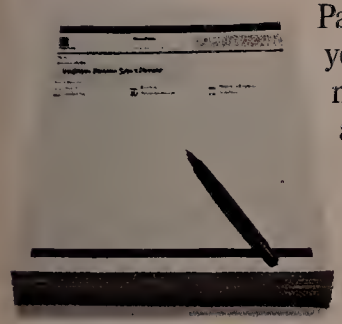
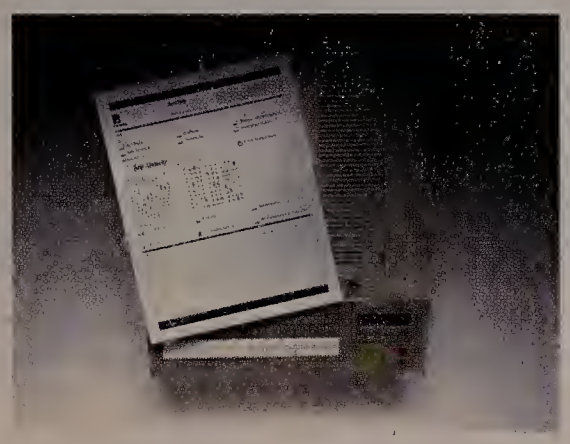


PaperWorks lets you fax documents to your PC and automatically store them in any hard disk category you want. So you can easily capture magazine articles, news clipping and press releases. And instantly record sales and negotiation results or contracts.



PaperWorks even saves you phone charges. For instance, you can store a price list now—and have PaperWorks distribute it to customers at night when rates are lower. Or send your customers a Smart Paper Retrieve form and let them ask for just the prices they need, when they need them.

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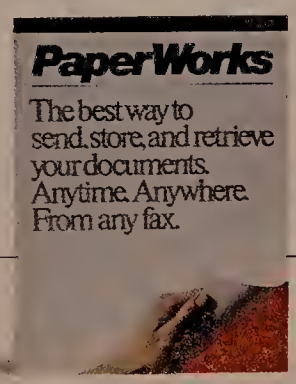

PAPER WARE™ System Requirements: 386SX, 386, 486SX or 486 PC with a mouse. 4MB RAM. Windows 3.0 or 3.1 and DOS 3.1 or later. Intel SatisFAXtion, The Complete Fax, The Complete Communicator, or CEI proFAX fax card. A hard disk with at least 20MB available.

A Complete Tool Kit for Visual Basic Developers

Visual Basic developers will get a hefty assist from Microsoft's $299 *Professional Toolkit for Visual Basic,* which provides additional controls, multimedia features, better support for direct calls to the *Windows* API, and the capability to create standard *Windows* help files. It also adds controls that let you include Object Linking and Embedding (OLE).

Many of the new controls were licensed from third parties that develop *Visual Basic* add-on tools. They include a graph control to build 2-D and 3-D graphs, bar charts, and pie charts; a grid control, which lays out tabular data in a spreadsheetlike format; and a control that creates windows confined to the inside of another window. The tool kit also has an OLE client control, which represents data from another application that's been embedded via OLE.

For developers who want to give users a touch of the familiar, a gauge control simulates an analog gauge such as a thermometer or dial. Animation controls let you show a short animated sequence as when a button is pressed or released. A common dialog control provides access to the library of ready-made dialogs found in *Windows 3.1*. A picture clip control lets you create a box that's a window into a larger bit-mapped image.

Looking to future interfaces, two handwriting controls provide support for pen-based applications, and a multimedia control, which looks like a row of buttons from a VCR, controls multimedia devices. There are also spiffier 3-D versions of some of the original *Visual Basic* controls.

In case none of these controls suits your needs, Microsoft throws in its *Custom Control Development Kit* to let you build your own. (You'll need a C compiler and an intimate knowledge of *Windows* to do so, however.) The *Windows Help Compiler* is also included, together with an on-line reference to the *Windows* API and a knowledge base of programming tips and examples. Unfortunately, there's still no full-fledged professional debugger or profiler, nor can multiple programmers work on the same program at once.

The controls and features in Microsoft's Professional Toolkit for Visual Basic pumped up our toolbox so it barely fit on the screen.

Microsoft's *Professional Toolkit for Visual Basic* is a bag of goodies for developers that's hard to pass up. And just in case you don't have *Visual Basic,* Microsoft is also selling *Visual Basic with Professional Toolkit*—the same package with a copy of *Visual Basic* thrown in—for $495.

—Brett Glass

IN BRIEF

Professional Toolkit for Visual Basic, Visual Basic with Professional Toolkit

WINDOWS A nifty suite of software controls to enhance applications created with Visual Basic.

Microsoft Corp.
One Microsoft Way
Redmond, WA 98052-6399
800/426-9400,
206/882-8080
Reader service no. 641

Compress and Encrypt With AttiTools Windows

Joining the growing ranks of *Windows* file managers, *AttiTools* is a collection of four *Windows* utilities that help you manage files and disk space.

AttiTools' centerpiece is Catalyst, a file manager with complete drag-and-drop file and directory manipulation; it also boasts compression and encryption capabilities, along with a file viewer that lets you examine data without launching the associated application.

With Catalyst, you can see how much space has been allocated to files on your hard disk, and you can move files and directories to new locations on your drives. If you need to find a particular file or files, you can use Catalyst's limited search capabilities or go over to *Dragnet,* a file search program that is also sold separately. *Dragnet* offers Boolean searches, so you can pull up all files that contain a specific word or phrase.

With *Dragnet,* you can search for word processing, graphics, spreadsheet, and data base files. And as with Catalyst, you can use the file viewer to preview the contents of a file without launching the application used to create it.

The other two *AttiTools* programs aren't as ambitious, but they are still useful. If you're wondering what's taking up so much room on your hard disk, Disk Space will give you a breakdown by extension, so you can see how much space is being used by EXE files, DOC files, and so on. Slingshot is a program launcher that lets you pull up groups and iconized programs. One nice feature: You can search for a program by typing the beginning letters of its name until the full name appears.

Dragnet alone lists for $49.98. But since the complete *AttiTools* collection gives you *Dragnet* and so much more for only $99.95, the search program all by itself may not seem worthwhile.

—Lincoln Spector

IN BRIEF

AttiTools 1.0, Dragnet 3.0

WINDOWS Dragnet lets you search your files for complex sequences of words. AttiTools bundles Dragnet with a file manager, a disk space analyzer, and a program launcher.

Attitash Software Inc.
20 Trafalgar Sq.
Nashua, NH 03063
603/882-4809,
603/882-4936 (fax)
Reader service no. 642

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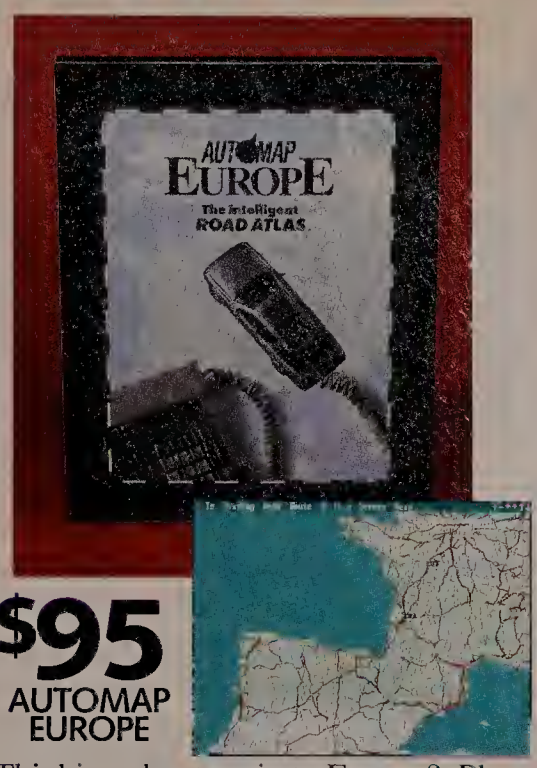
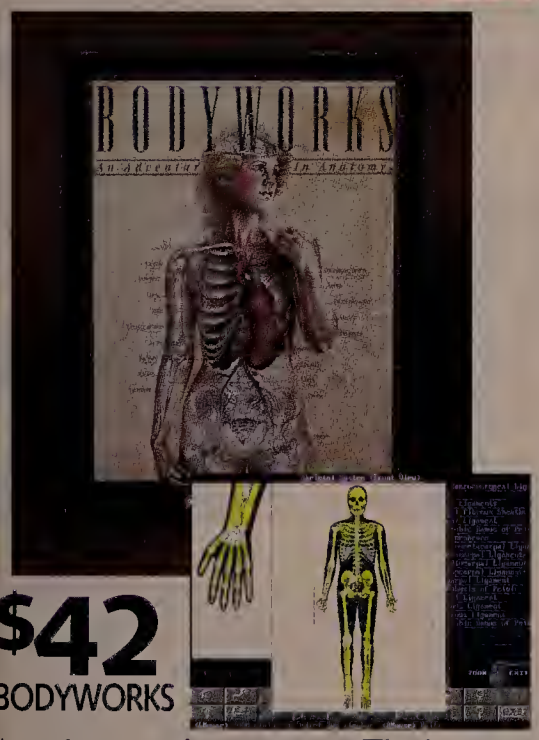
Just tell AutoMap where and when you're starting out and where you want to go and it will layout the course for you. This colorful, computerized road atlas for PCs has simple-to-read map displays and will print easy-to-follow trip instructions. It can chart the fastest path or a more scenic route. AutoMap includes 359,220 miles of roads & 51,921 cities.



$95
AUTOMAP EUROPE

Thinking about a trip to Europe? Plan ahead with AutoMap Europe. It includes maps from Albania to Yugoslavia. Detailed maps include 250,220 miles of Motorways, dual carriage ways, primary roads, secondary roads, tunnels, ferries, 8,497 cities, townships and villages. It will print detailed driving instructions, even telling you what signs to look for.

EXPLORE IT!



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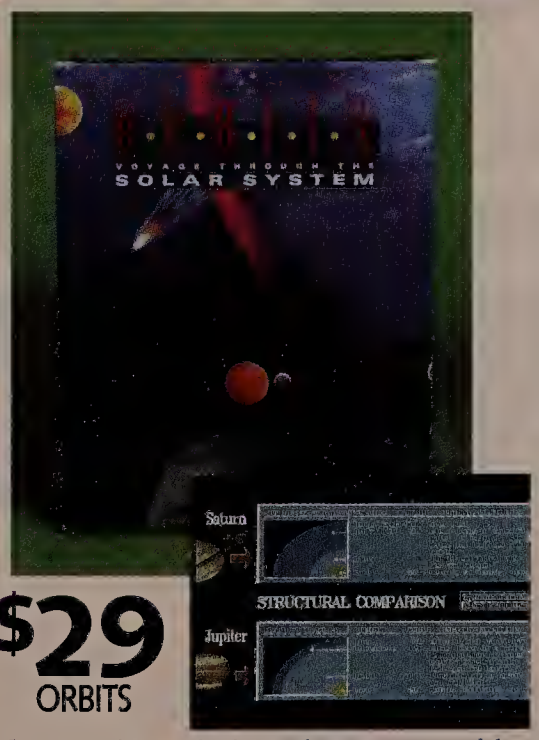

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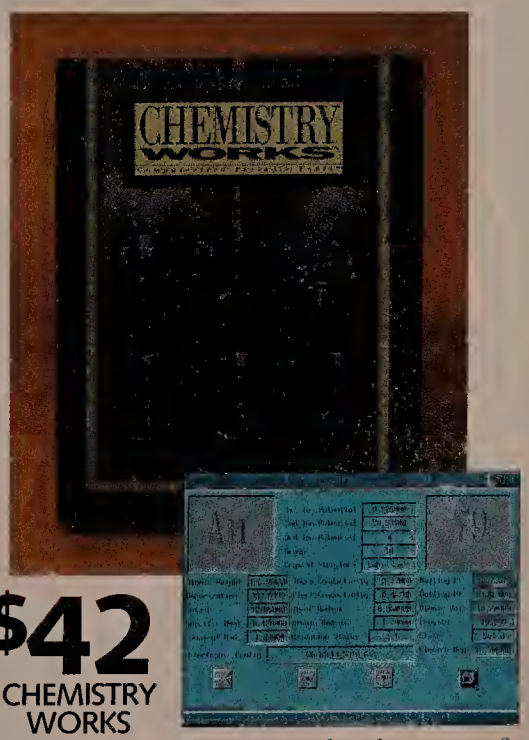
Voyage through the solar system with Orbits. An interactive space simulator and atlas of the solar system, Orbits transforms science fiction fantasy into dazzling reality. With Orbit-Trek, you can deploy satellites, run space missions and rendezvous with cosmic probes. Embark on a great adventure with Orbits, your window to the solar system.



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HiJaak Now Captures and Converts in Windows

It's easy to add graphics to your documents. Just grab some clip art, slap it in the file, and you're done, right? No. Finding the right image in a compatible format—let alone the dozens of subtle variations on each format—can be exasperating. That's why *HiJaak*'s entry into the *Windows* market is good news for anyone who wants to spark up their reports and presentations with images.

Inset Systems' $249 utility lets you convert graphics files between a broad range of raster (bit-mapped) and vector (line-drawing) formats.

But that's only the beginning. With *HiJaak for Windows 1.0*, you can capture DOS or *Windows* screens and print them. Moreover, this flexible product lets you view multiple images and scale, crop, or rotate them in 1-degree increments. And you can adjust color, brightness, and contrast and convert color to gray scales and vice versa.

Windows 3.1 users can use *HiJaak* as an Object Linking and Embedding (OLE) server. Want to add a graphic to a *Word for Windows* report? Just pull down *Word*'s Insert Objects menu and select an object type from any of *HiJaak*'s 61 file formats. After you select the file, *HiJaak* converts the image to a compatible format and places it on the page. To manipulate the image, just double-click on it—up pops a *HiJaak* dialog box with the file loaded.

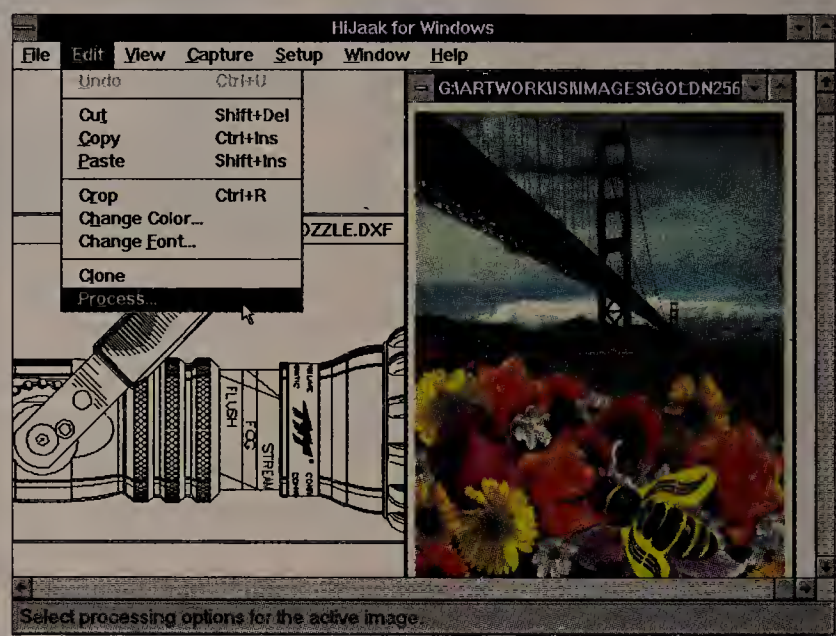
HiJaak supports a broad range of file formats, including PCX, TIFF, CGM, DXF, Macintosh PICT 1 and 2, TARGA, and EPS (export only). However, while it supports vector-to-raster conversion, it won't convert raster images to vectors. A special offer for DOS *HiJaak 2.1* users costs $60; for version 1.*x* users, the price is $105. *Windows 3.0* or *3.1* is required. —*Daniel Tynan*

IN BRIEF

HiJaak for Windows 1.0

WINDOWS Inset's $249 utility lets you import almost any kind of graphics file into your Windows documents.

Inset Systems Inc.
71 Commerce Dr.
Brookfield, CT 06804
800/374-6738,
203/740-2400
Reader service no. 643



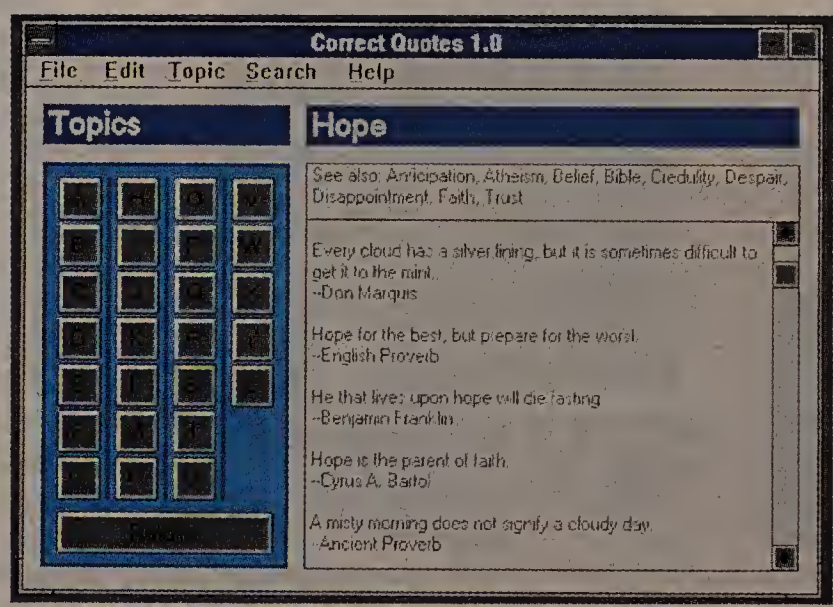
Inset's HiJaak converts graphics files between raster and vector formats, captures and prints DOS or Windows screens, and more.

Three Utilities That Help You Write Right

Three new products from WordStar's Writing Tools Group, all available for both DOS and *Windows* and priced under $60, help you look like you earned an A in English.

If you hate to crank out letters, *Correct Letters* gives you hundreds of ready-made letters for every business situation, from collecting bills to turning down invitations. Just choose a letter and open your word processing program. The template letter automatically appears, and you can tailor it to your liking.

Correct Quotes, a compendium of 5000 quotations, helps you sound impressive when you have to be a toastmaster or wax philosophical to your boss. Choose *President*, for example, and you get nine quotes, including this one from Clarence Darrow: "When I was a boy I was told that anybody could become President. I'm beginning to believe." You can paste a quote into any *Windows* application or add your own quotes, topics, and cross-referencing.



Correct Quotes provides more than 5000 quotations—a simple way to add panache to your writing and speaking.

Those who really miss Mr. Novak may find it easier to click on *Correct Writing*, an on-line reference tool full of guidelines for proper style, punctuation, and writing techniques. Even the interface is reminiscent of English class—the screen looks like a wire-bound book with a subject index appearing on tabs along the bottom.

With these three tools on your computer's reference shelf, you'll find there ain't no excuse not to write good.

—*Bronwyn Fryer*

IN BRIEF

Correct Letters, Correct Quotes, Correct Writing

WINDOWS Three new packages, all available for both DOS and Windows, help you communicate correctly.

WordStar Int'l Inc.
201 Alameda Del Prado
Novato, CA 94949
800/523-3520,
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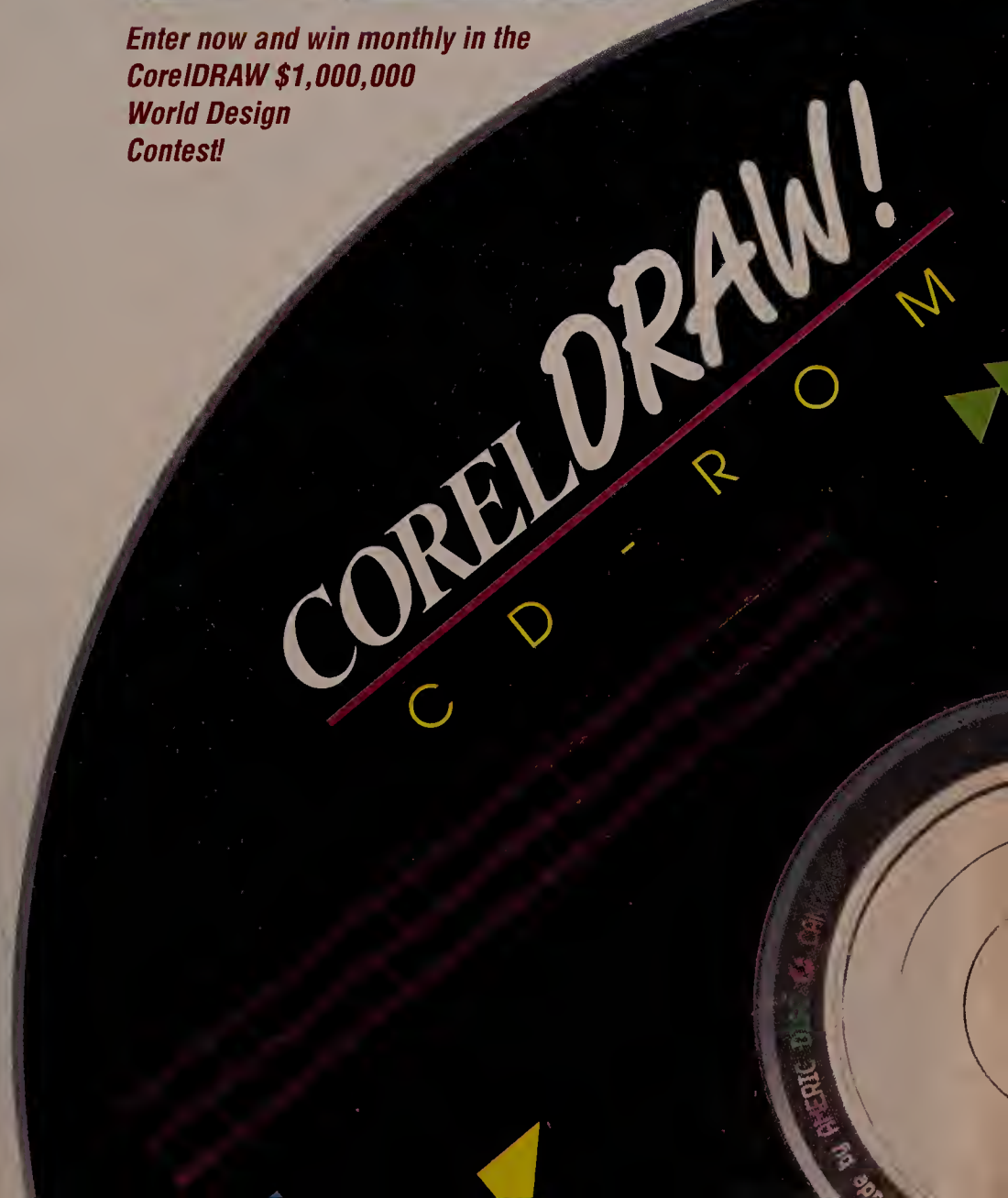

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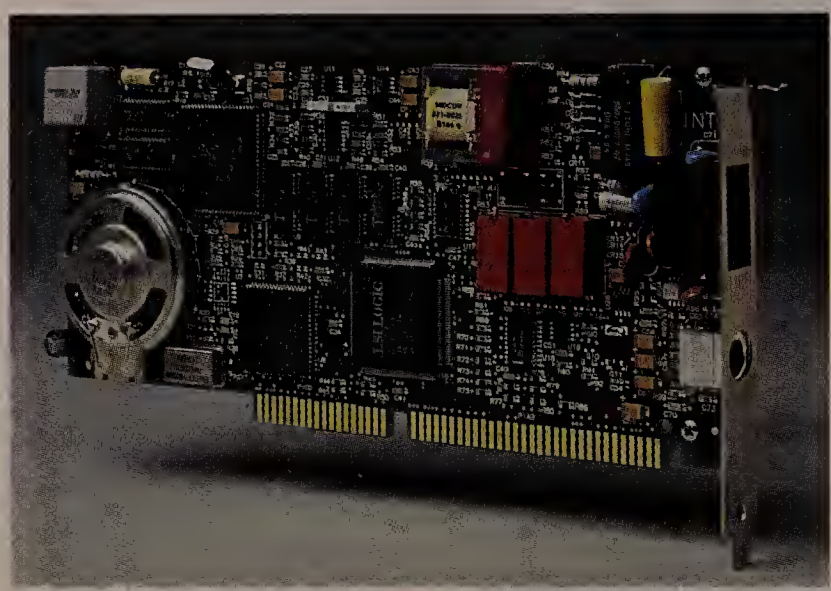
Intel Drives Down the Cost of Fax

From 2400 to 14,400 baud, these fax-modems and Windows fax applications give you a wide range of features at aggressive prices.



The $499 SatisFaxtion Modem/400 leads Intel's new line of affordable fax-modems; it transmits faxes and data at 14,400 baud.

Fax-modem prices are falling—and Intel is leading the way with a new line of SatisFaxtion fax-modems that promise to deliver street prices starting under $100. As if that were not enough, Intel is also rolling out two new *Windows*-based fax programs, including one that automatically converts incoming faxes to text files.

At the high end of the Intel SatisFaxtion line is the $499 Modem/400, a 14,400-baud internal fax-modem. This product supports the V.42bis standard, a 4-to-1 compression scheme that speeds data throughput. Error control is aided by an on-board Intel 80186 microprocessor and 512K of RAM that monitor data exchange and provide high-speed data buffering.

The SatisFaxtion Modem/400e, an external version of the Modem/400, also supports data and fax line speeds as high as 14,400 baud but lacks some of the features of its internal sibling. Priced slightly higher at $549, the Modem/400e is an option if your PC lacks an available expansion slot.

Replacing the original SatisFaxtion board is the Modem/200, a $369 fax-modem that sends and receives data at 2400 baud and faxes at 9600 baud. For the entry-level user there's the Modem/100, a no-frills $129 internal fax-modem that sends faxes at 9600 baud, receives them at 4800 baud, and includes a 2400-baud modem. Unlike its siblings, the Modem/100 includes no error control, data compression, or diagnostic software, so what you save up front could cost you later in line charges.

All the SatisFaxtion fax-modems feature Intel's WYPIWYF (What You Print Is What You Fax) pop-up interface, allowing you to send a fax from most DOS and *Windows* programs. All the fax-modems come with *Crosstalk Communicator*—a communications package—and a three-year warranty.

Intel's new fax software includes *Faxability Plus* and *Faxability Plus/OCR*, which let you send and receive faxes from within *Windows*. You can print, forward, and rotate incoming faxes, as well as save them in a variety of image file formats including PCX, DCX, and TIFF.

The $249 *Faxability Plus/OCR* uses optical character recognition technology from Calera Recognition Systems to convert incoming faxes into your choice of 50 file formats, including *Microsoft Word, 1-2-3,* and *PageMaker. Faxability Plus* (which does not have OCR) costs $119.

—*Jeff Bertolucci*

IN BRIEF

SatisFaxtion fax-modems and Faxability software

WINDOWS Intel's new series of fax-modems and fax software offer impressive features at good prices.

Intel Corp.
5200 N.E. Elam Young Pkwy.
Hillsboro, OR 97124-6497
800/538-3373,
503/629-7000
Reader service no. 645

Don't Forget Another Meeting

If you're sick of scribbling appointments on stick-'em notes and scraps of paper, it's time to check out *About Time 2.1.* The new version of Softsystems' DOS-based scheduling and calendar program includes a streamlined interface, a TSR option, and enhanced security features for network users.

Softsystems has redesigned the *About Time* interface to give it more of a graphical look—including shaded windows that highlight your name, the date and time, the month, a to-do list, and menu options. But despite its *Windows*-like look, there's no mouse support. You'll have to toggle through the menus using the keyboard, although a commonsense restructuring of the menus makes this easier than in previous versions.

You can display appointments in finer increments than before, with time slots ranging from 1 minute to 12 hours. A new phone directory helps keep track of your important business contacts, and the improved to-do list lets you set a priority for each list item.

Most users will probably want to run the program in its new TSR mode. According to Softsystems, the TSR module requires 14K of conventional RAM (below 640K) on PCs with extended memory, and 30K of RAM on systems without extended memory.

A network version now offers a "private appointment" option.

About Time 2.1 costs $99 for the single-user DOS version, $295 for the six-user network version, and $5000 for the unlimited-user version. The program will run under Novell, 3Com, Banyan, *LANtastic,* and other NETBIOS-compatible LANs, according to Softsystems. —*Jeff Bertolucci*

IN BRIEF

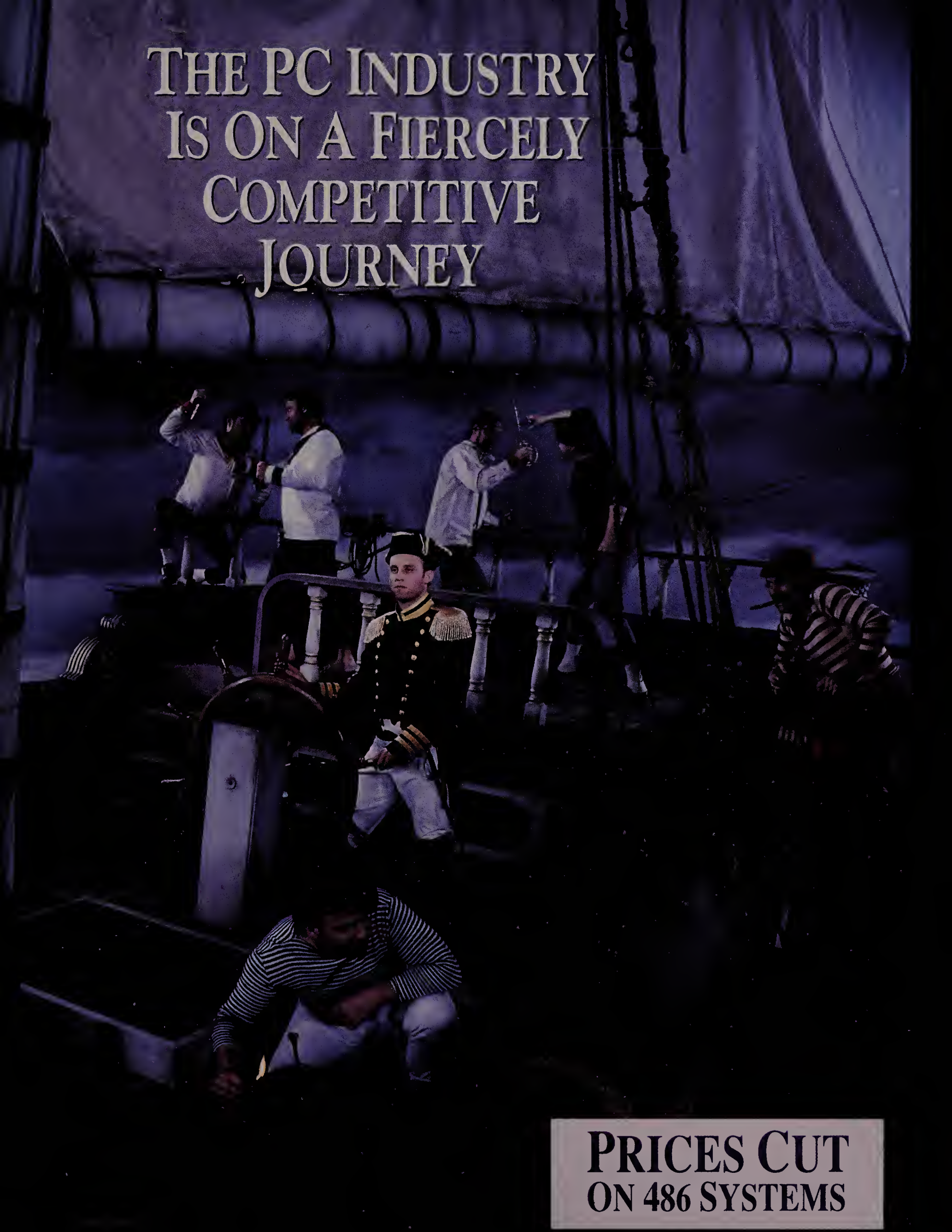
About Time 2.1

The new version of this scheduling program includes an improved user interface, a TSR option, and enhanced security.

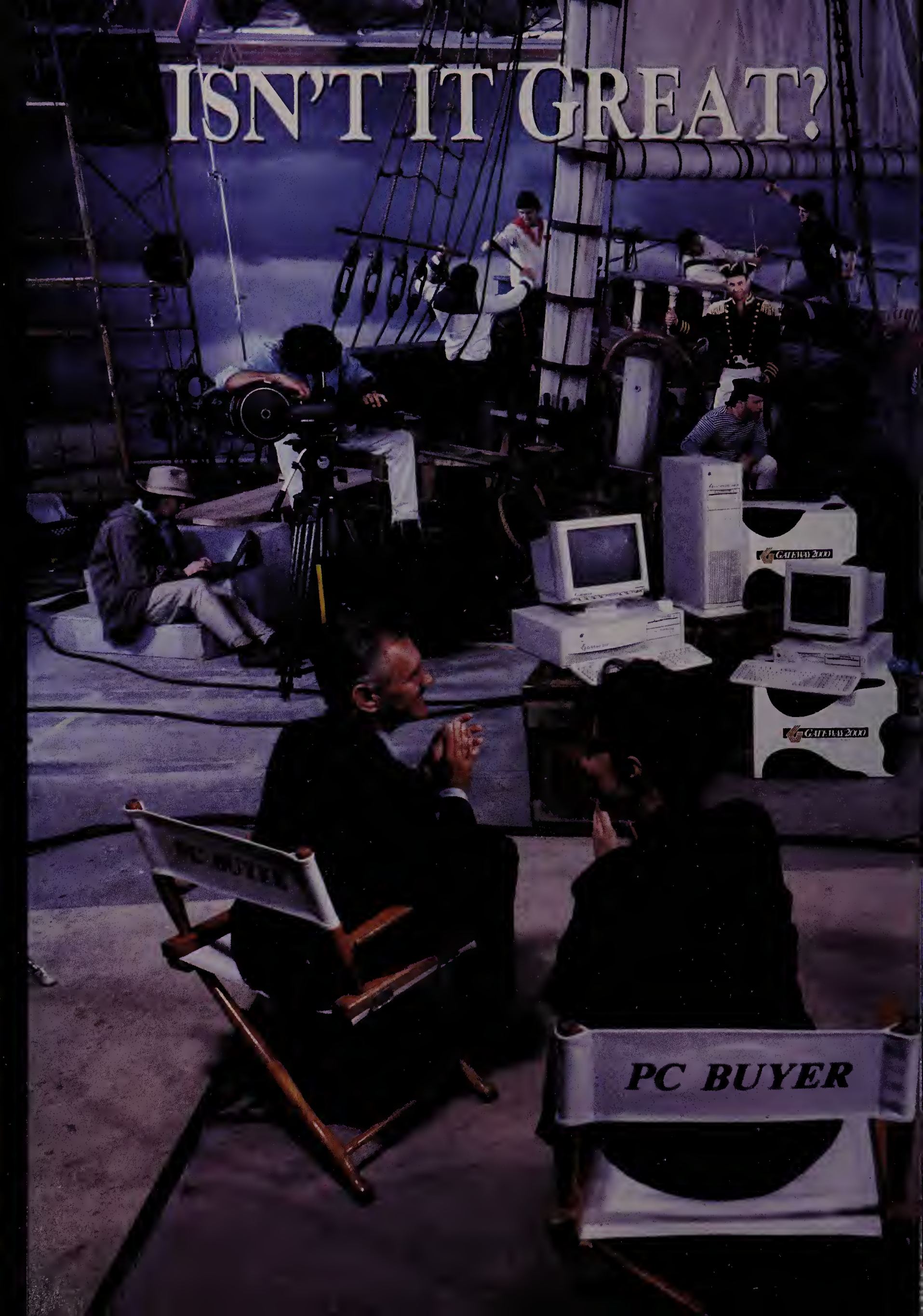
Softsystems, Inc.
148 W. Orange St.
Covina, CA 91723
818/332-1919,
818/331-5878 (fax)
Reader service no. 647

(continues on page 101)

THE PC INDUSTRY IS ON A FIERCELY COMPETITIVE JOURNEY



PRICES CUT ON 486 SYSTEMS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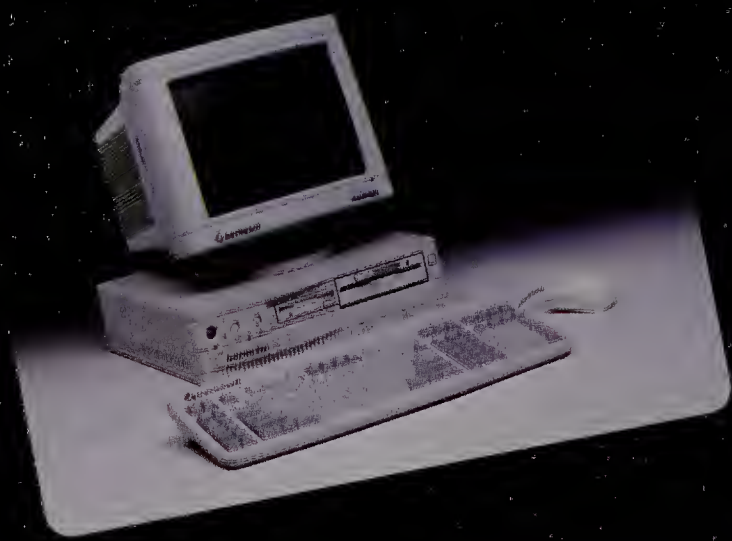
GATEWAY2000

"You've got a friend in the business."



NEW 386SX/25

Gateway 2000's new 386SX/25 comes in a compact, mini desktop model. A roomy desktop model is standard on the 386DX/33, or you can order a tower model for an additional $100.

HERE'S YOUR TICKET: GATEWAY 2000 386 PCs

FEATURE PRESENTATION
386 SYSTEMS

The two systems in our 386 product cast give you the best price/performance in SX and DX categories. We introduced some new talent last month — a 25MHz 386SX. This system outperforms 16 and 20MHz 386SX machines, yet it's priced the same or better.

Our 33MHz 386DX, chosen by *Computer Shopper* readers as the Best Buy of 1991 in its category, is a box office favorite. This fully featured system offers the most value on the market for under $2,000.

25MHz 386SX

System Highlights: 4MB RAM ■ 80MB Western Digital® IDE hard drive with 32K read-look-ahead cache buffer ■ 16-bit VGA graphics with 512K ■ 14" CrystalScan 1024 VGA color monitor, up to 1024 x 768 interlaced resolution ■ five 16-bit expansion slots available in standard configuration ■ mini desktop model ■ **$1,595**

33MHz 386DX

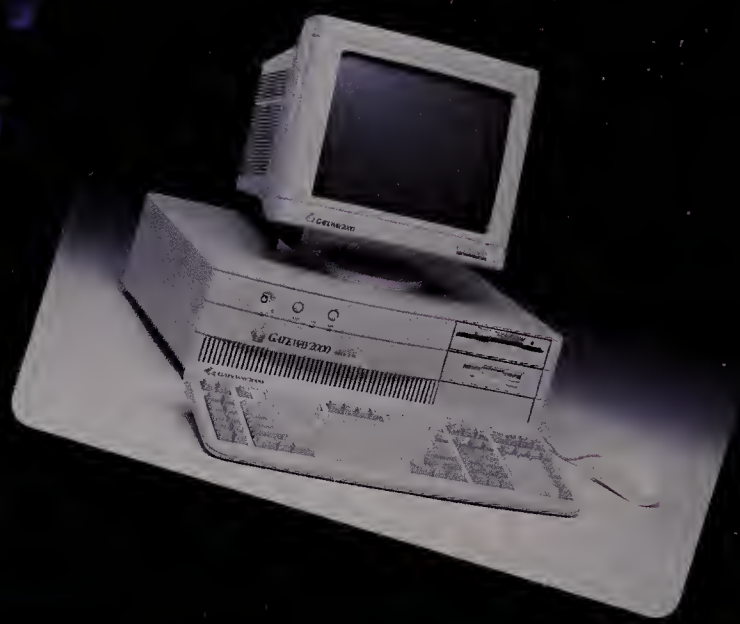
System Highlights: 64K cache RAM ■ 4MB RAM ■ 120MB Western Digital IDE hard drive with 64K multi-segmented cache ■ 16-bit Diamond Speedstar Plus™ video card with 1MB ■ 14" CrystalScan 1024NI VGA color monitor, up to 1024 x 768 non-interlaced resolution ■ seven 16-bit slots on motherboard, one 32-bit memory slot and five 16-bit ISA slots available in standard configuration ■ desktop model is standard ■ ~~$1,995~~ **$1,795**

All Gateway 2000 systems come fully configured with all the features you want, including two diskette drives, a programmable 124-key AnyKey™ keyboard, a Microsoft® mouse, MS DOS® 5.0, the new Windows™ 3.1 and your choice of one application software option. See the back pages of this ad for complete configurations and information about software options, upgrades and peripherals.

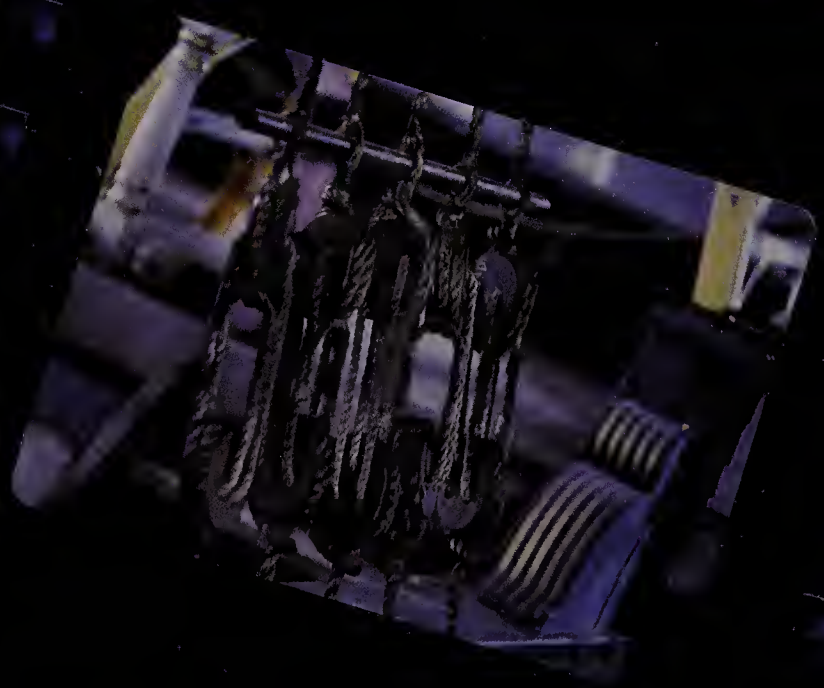
GATEWAY2000

"You've got a friend in the business."

Gateway 2000's new 486SX/25 comes with 4MB RAM, a 200MB IDE hard drive and the ATI Graphics Ultra video card with graphics coprocessor for only $2,195.



NEW 486SX/25



BLOCKBUSTERS: GATEWAY 2000 486 PCs

Making its debut some years ago, 486 technology has finally reached a price point at which it is upstaging 386 technology in value. Gateway 2000's 486 systems have always been star performers, but recent price reductions and the introduction of a 25MHz 486SX and two new DX2 systems make the Gateway 2000 486 line more appealing than ever.

25MHz 486SX

Besides being faster than any 386 machine on the market, the 486SX/25 is upgradeable to a 486DX2/50 if you need increased performance in the future.

System Highlights: 4MB RAM ■ 200MB Western Digital® IDE hard drive ■ ATI™ Graphics Ultra ■ 14" CrystalScan 1024NI VGA color monitor, up to 1024 x 768 non-interlaced resolution ■ desktop model is standard ■ ~~$2,395~~ **$2,195**

33MHz 486DX

The 486DX/33, our best-selling system until the DX2s came along, is still an excellent machine, especially with ATI video. Plus, it's upgradeable to a 66MHz DX2 when this CPU is introduced.

System Highlights: 64K cache RAM ■ 4MB RAM ■ 200MB Western Digital IDE hard drive ■ ATI Graphics Ultra ■ 14" CrystalScan 1024NI VGA color monitor, up to 1024 x 768 non-interlaced resolution ■ desktop model is standard ■ ~~$2,795~~ **$2,495**

50MHz 486DX2

This is without a doubt the fastest system at the most incredible price on the market today. The combination of a DX2 dual speed processor, an ATI Graphics Ultra video card and a fast IDE drive, made faster with RIDE BIOS, makes this machine worthy of an Academy Award. Our benchmarks show a 35% increase in performance over a 33MHz 486DX. Coretest benchmarks show large block disk-to-memory operations are over 30% faster with RIDE.

System Highlights: 64K cache RAM ■ 8MB RAM ■ 200MB Western Digital IDE hard drive with RIDE BIOS ■ ATI Graphics Ultra ■ 14" CrystalScan 1024NI VGA color monitor, up to 1024 x 768 non-interlaced resolution ■ desktop model is standard ■ ~~$2,995~~ **$2,795**

EISA SYSTEMS — 33MHz 486DX & 50MHz 486DX2

The 33MHz system is upgradeable to a 66MHz DX2 later this year.

System Highlights: 128K cache RAM ■ 8MB RAM ■ 340MB Maxtor® SCSI hard drive ■ 32-bit EISA SCSI controller ■ Diamond Speedstar Plus™ 16-bit VGA graphics ■ 14" CrystalScan 1024NI VGA color monitor, up to 1024 x 768 non-interlaced resolution ■ floor-standing tower model is standard ■ 486DX/33 EISA is **$3,795** ■ 486DX2/50 EISA is ~~$3,995~~ **$3,895**

Personal service is the guiding force at Gateway 2000.

Your system is carefully assembled according to your configuration.

Knowledgeable, friendly people answer your call and welcome your questions.

Plus, you can be assured that your system is built with all the pride of a conscientious work ethic that is ...

We're happy to share information on systems and peripherals to meet both your present and future needs.

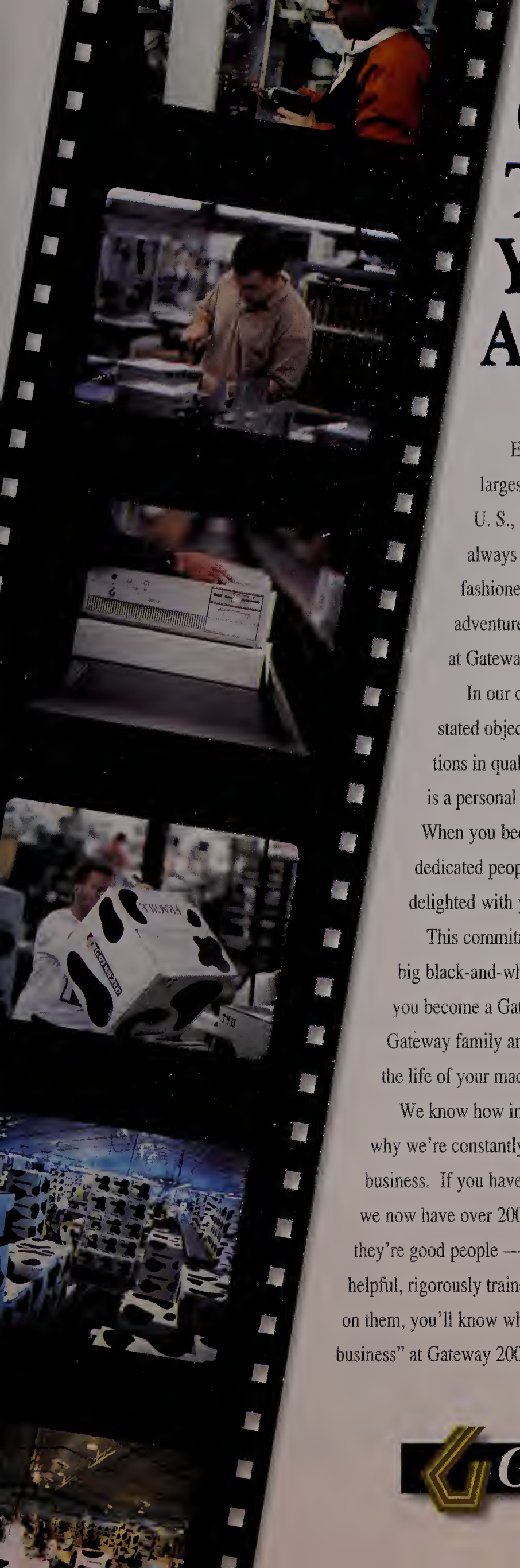
...alive and well in North Sioux City South Dakota

We'll help you custom-design the system best suited to your personal requirements.

After rigorous and thorough quality and performance checks

Your order receives our immediate attention.

...your system is packed to insure that it reaches you in perfect working order



OUR CREW TREATS YOU LIKE A STAR

Even though Gateway 2000 is now the largest direct market PC manufacturer in the U. S., we continue to do business the way we always have — with an emphasis on old-fashioned, personal service. In the epic adventure of buying a computer, you're the star at Gateway 2000.

In our company mission statement, one of our stated objectives is to exceed customer expectations in quality, service and value. This objective is a personal challenge to each of us at Gateway. When you become a customer, you have over 1,400 dedicated people striving to make sure you're delighted with your Gateway 2000 purchase.

This commitment extends far beyond the day those big black-and-white cow-spotted boxes arrive. When you become a Gateway customer, you're part of the Gateway family and you get free technical support for the life of your machine.

We know how important service is to you, which is why we're constantly striving to provide the best in the business. If you have a question or something goes wrong, we now have over 200 people on-line to help you. And they're good people — experienced and patient, friendly and helpful, rigorously trained and tested. If you ever need to call on them, you'll know why we say "you've got a friend in the business" at Gateway 2000.

GATEWAY2000

"You've got a friend in the business."

BEHIND THE SCENES
PERSONAL SERVICE

GOODIES TO GO

Free Application Software Options

When you purchase any Gateway 2000 computer system, you choose one application software option at no additional cost. We'll install your software on your hard drive, optimally configured for your system and Windows, and provide master diskettes and manuals. Additional software packages are also available at extremely competitive prices. Ask your Gateway sales person for complete details. Choose from the following application software options:

Option #1 — *Microsoft Excel for Windows™ 4.0*

- New version of this powerful spreadsheet
- Includes online help for Lotus 1-2-3® users

Option #2 — *Microsoft Word for Windows™ 2.0*

- Best-selling word processor for Windows
- New version 2.0 adds spectacular refinements
- Includes online help for WordPerfect® users

Option #3 — *Microsoft PowerPoint for Windows™ 2.0*

- Easy-to-use desktop presentations
- Creates high-quality overheads and 35mm slides

Option #4 — *Borland® Paradox® 3.5*

Option #5 — *The Entrepreneur Pack* includes the latest Windows versions of:

Sorry — we sell peripherals only with the purchase of a Gateway 2000 system, or to people who are already Gateway 2000 customers.

Microsoft's Windows 3.1 is now standard with all Gateway 2000 systems. Windows 3.1 includes many new features and enhancements you'll enjoy:

- *Fewer UAEs*
- *Improved performance*
- *Built-in multimedia capabilities*
- *Better network support*
- *Includes four True Type font families*

This offer includes the identical applications contained in retail packages but will not include the retail box. You get all master diskettes and manuals, shrink-wrapped and packaged in a Gateway 2000 box.

WITH YOUR GATEWAY 2000 PC

- *Microsoft Works*,™ integrating word processing, spreadsheet, and database in one easy-to-use program
- *Microsoft Publisher*™ for creating page layouts
- *Microsoft Money*™ to help you write checks, set budgets, track expenses
- PLUS an *Entertainment Pack* with eight games including Tetris®

Option #6 — *The Windows Programmer Pack*, includes everything you need to create programs for Windows: *Microsoft QuickC for Windows*,™ *Visual Basic for Windows*,™ *Windows Control Development Kit*,™ *Windows Help Compiler*™ and *Windows Programmers' Online Reference*.™

Option #7 — *Microsoft Project for Windows*™ *3.0*

- Flexible and easy project management program
- Includes interactive online tutorial

Peripherals

The ATI Graphics Ultra

ATI achieves a quantum leap in performance with its coprocessor-equipped video card. The ATI Graphics Ultra is the fastest video card available in its class — up to 10 times faster than standard VGA. The Ultra supports resolutions up to 1280 x 1024. And because it is compatible with many common graphics standards, the Graphics Ultra makes applications easy to install using standard video drivers provided with the software.

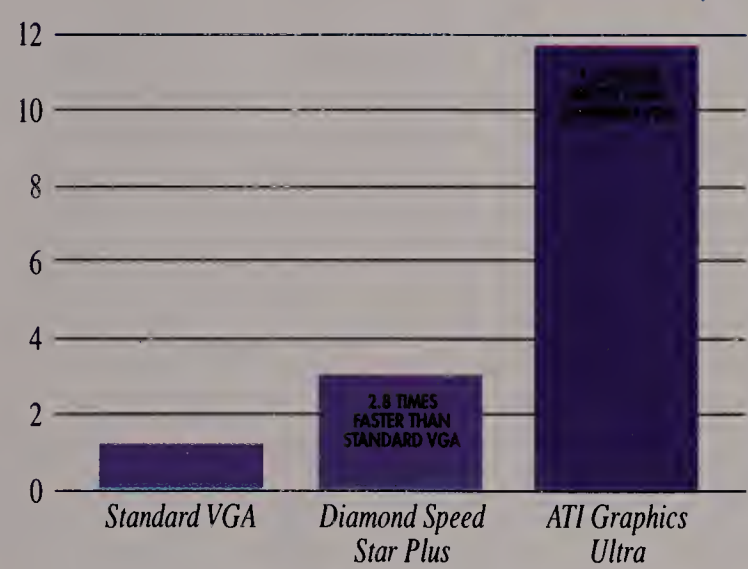
The ATI Graphics Ultra video card is standard with all 486 ISA systems. It's an upgrade option with the purchase of a 386DX or a 486 EISA system for an additional $100.

The Gateway 2000 TelePath™ Fax/Modem

The Gateway 2000 TelePath may set a new box office sales record for us. It's no wonder. For only $195, you get the Gateway 2000 TelePath — a 14,400 bps modem, V.32bis, with 9,600 bps fax capability plus WinFax Pro,™ Crosstalk® for Windows, Qmodem® and a free 30-day basic services CompuServe® membership.

- Fax mode: V.17, V.29, and V.27ter
- Data mode: V.32bis, V.32, V.22bis, V.22, V.21, Bell 212A and 103, V.42 and MNP 2-4 error correction, V.42bis/MNP 5 data compression

ATI Graphics Ultra Performance Comparison



Figures computed on a 486DX/33 and provided by ATI Technologies Inc.

The 15-Inch CrystalScan 1572FS

The new 15-inch CrystalScan color monitor has a flat, square, non-glare screen, reducing distortion around the corners and providing edge-to-edge display area. The refresh rate is higher, 72Hz, for added image stability and flicker-free display. The non-interlaced CrystalScan 1572FS will support resolutions up to 1280 x 1024. Plus, we've moved the fine tuning controls to the front of the monitor for easy access. The CrystalScan 1572FS is available only with the purchase of a 386DX or 486 system for an additional $195. (Availability is limited.)

GATEWAY 2000 BOX OFFICE HITS

NOMAD 325SXL

- 25MHz, 386SXL Processor
- 2MB RAM
- 1.44MB 3.5" Drive
- 80MB Hard Drive
- Backlit 10" VGA Screen, 64 Grays
- Size 8.5" x 11" x 1.8", 5.8 lbs.
- 7 Hr.* NiCad
- Battery & Charger
- 1 Parallel/1 Serial Port
- 79-Key Keyboard
- Pointing Device
- MS DOS 5.0 & Windows™ 3.1

$1995

NOMAD 420SXL

- 20MHz, Intel® 486SX Processor
- 4MB RAM
- 1.44MB 3.5" Drive
- 80MB Hard Drive
- Backlit 10" VGA Screen, 64 Grays
- Simultaneous Video with 1MB
- Size 8.5" x 11" x 1.8", 5.8 lbs.
- 6 Hr.* NiCad
- Battery & Charger
- 1 Parallel/1 Serial Port
- 79-Key Keyboard
- Pointing Device
- MS DOS 5.0 and Windows 3.1

$2795

NOMAD 425DXL

- 25MHz, Intel 486DX Processor
- 4MB RAM
- 1.44MB 3.5" Drive
- 120MB Hard Drive
- Backlit 10" VGA Screen, 64 Grays
- Simultaneous Video with 1MB
- Size 8.5" x 11" x 1.8", 5.8 lbs.
- 6 Hr.* NiCad
- Battery & Charger
- 1 Parallel/1 Serial Port
- 79-Key Keyboard
- Pointing Device
- MS DOS 5.0 and Windows 3.1

$3495

25MHz 386SX

- Intel 386SX Processor
- 4MB RAM
- 1.2MB & 1.44MB Drives
- 80MB 17ms IDE Cache Drive
- 16-Bit VGA with 512K
- 14" CrystalScan 1024 Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey™ Keyboard
- Microsoft® Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$1595

33MHz 386DX

- Intel 386DX Processor
- 64K Cache RAM
- 4MB RAM
- 1.2MB & 1.44MB Drives
- 120MB 15ms IDE Cache Drive
- 16-Bit VGA with 1MB
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$1795

25MHz 486SX

- Intel 486SX Processor
- 4MB RAM
- 1.2MB & 1.44MB Drives
- 200MB 15ms IDE Cache Drive
- ATI™ Graphics Ultra Video
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$2195

33MHz 486DX

- Intel 486DX Processor
- 64K Cache RAM
- 4MB RAM
- 1.2MB & 1.44MB Drives
- 200MB 15ms IDE Cache Drive
- ATI Graphics Ultra Video
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$2495

50MHz 486DX2

- Intel 486DX2 Processor
- 64K Cache RAM
- 8MB RAM
- 1.2MB & 1.44MB Drives
- 200MB 15ms IDE* Cache Drive
- ATI Graphics Ultra Video
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$2795

**Enhanced IDE with RIDE (Rapid Integrated Drive Electronics)*

50MHz 486DX2 EISA

- Intel 486DX2 Processor
- 128K Cache RAM
- 8MB RAM
- 1.2MB & 1.44MB Drives
- 340MB 15ms SCSI Cache Drive
- 32-Bit EISA SCSI Controller
- 16-Bit VGA with 1MB
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software
- Tower Model is Standard

$3895

OTHER SYSTEMS

- Standard configurations also include: 16MHz 386SX, 20MHz 386SX, 25MHz 386DX, 33MHz 486DX EISA. Call for details and pricing.

** Battery life was measured using PC Magazine's Battery Rundown Test with power management enabled. Actual results may vary depending on configuration and applications.*

All prices and configurations are subject to change without notice. Prices do not include shipping. Components, peripherals and software are sold only with the purchase of a system, or to customers who already own Gateway 2000 systems. Some limitations apply.

GATEWAY2000

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intel inside

800-523-2000

610 Gateway Drive • P.O.Box 2000 • North Sioux City, SD 57049-2000 • 605-232-2000 • Fax 605-232-2023

Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (CDT)

GLOBAL RELEAF

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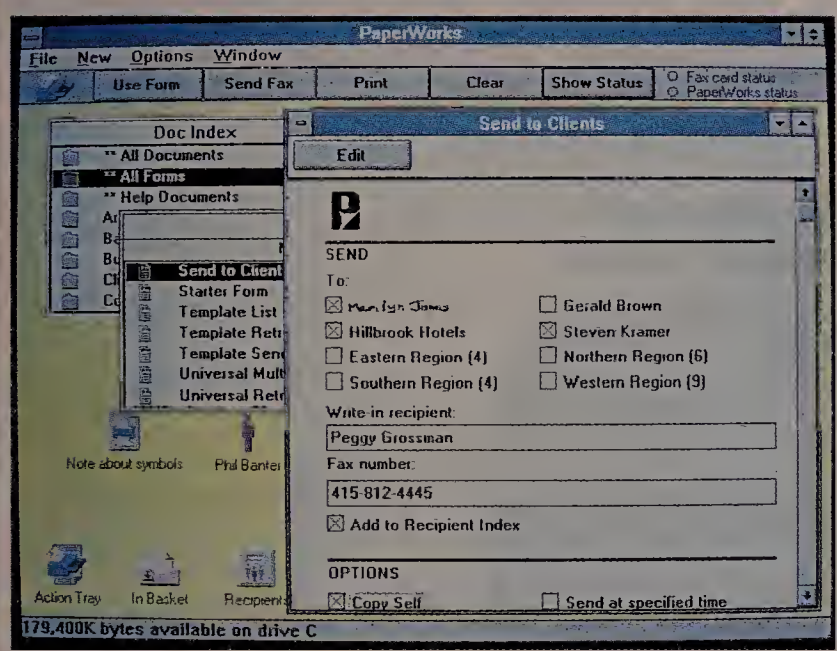
Smart Paper: Send It Wherever You Want

XSoft's *PaperWorks* is a unique new *Windows*-based program that lets you use your PC and fax-modem to retrieve, store, and distribute documents when you're away from the office.

To use *PaperWorks*, you must create document and recipient indexes using its *Windows* graphical interface. The document index lists the documents you'll want to access remotely, and each file name can have 40 characters. You arrange the document index by file name, date, size, or type (image or nonimage file).



XSoft's PaperWorks lets you use your office PC and fax-modem to receive, store, and distribute documents when you're on the road.

The recipient index lists the name, fax number, and other important information for the people you plan to fax. *PaperWorks* uses this information to dial fax numbers and create custom cover sheets for each recipient.

Use the program's "smart paper" forms to interact with *PaperWorks* when you're on the road. Print out these one-page forms, fill in the requested information, fax them back to your *PaperWorks*-equipped PC, and the program will either send, store, or retrieve documents depending on which form you used.

Because *PaperWorks* works only with those forms created on your PC, your data is protected from other *PaperWorks* users. For extra protection, you can create a personal security code that must be marked on your form before the program will process it.

Priced at $249.95, XSoft's *PaperWorks* gives business travelers and their clients fast access to necessary documents without the burden of lugging them along for the ride. *PaperWorks* works with four fax boards: Intel's SatisFaxtion, The Complete PC's Complete Fax/9624 and Complete Communicator, and Singapore Technologies' CEI ProFax.

—*Jeff Bertolucci*

IN BRIEF

PaperWorks 1.0

WINDOWS An innovative Windows program that lets business travelers use a fax machine to access documents from their PCs.

XSoft
Division of Xerox Corp.
3400 Hill View Ave.
Palo Alto, CA 94303
800/432-9329,
800/428-3329 (fax)
Reader service no. 646

PKZIP®

PKZIP compresses your files to free up disk space and reduce modem transfer time. You can compress single files or entire directory structures into one archive file for easy storage or transfer. Compression typically results in saving 50% of the space taken up by the original file, effectively doubling the amount of information that will fit on a disk. Many database and spreadsheet files compress by as much as 90%.

Software developers can significantly reduce their product duplication costs by decreasing the number of disks required to distribute their application. Call for Distribution License information.

PKLITE increases your valuable disk space by compressing executable (.EXE and .COM) files by an average of 45%. The operation of PKLITE is transparent to you and to other programs such as menu systems and batch files, all you will notice is alot more available disk space!

PKLITE™ Executable File Compressor

PKLITE can actually reduce the start up time of many programs due to reduced drive access time. PKLITE can be used on hard and floppy disks!

Software Developers, save disk space and media costs with smaller executables. You can distribute your software in a compressed form with PKLITE Professional. PKLITE Professional also gives you the ability to compress files so that they cannot be expanded, hindering reverse engineering of your programs.

PKWARE® INC.
The Data Compression Experts
9025 N. Deerwood Drive Brown Deer, WI 53223
(414) 354-8699 Fax (414) 354-8559

PKZIP $47.00
PKLITE $46.00 PKLITE Professional $146.00
Please add $3.50 shipping and handling per package in the US & Canada, $5.00 overseas. Wisconsin residents please add 5% state sales tax & applicable county sales tax.

VISA MasterCard No COD Orders

pcw-6/92

Circle 212 on reader service card

SORRY, HP. NEC WINS BY A TECHNICAL KNOCKOUT.

Introducing the lowest priced fully-configured PostScript® printer.

FEATURES	Hewlett-Packard LaserJet III	Okidata OL830	Texas Instruments MicroLaser Turbo	NEC Silentwriter Model 95
PostScript Language Level 2	N/A	N/A	Yes	Yes
LaserJet III Emulation (PCL5)	Yes	No	No	Yes
Automatic Emulation Switching	No	Yes	Yes	Yes
Enhanced Resolution Technology	Yes	No	No	Yes
Automatic Interface Monitoring	No	No	No	Yes
Envelope Feeder & Cassette	No	No	No	Yes
Suggested List Price	$2495	$1995	$2249	$1749

THE NEC SILENTWRITER® MODEL 95

Talk about flooring the competition! Now there's a laser printer that's fully configured for both MS-DOS® and Mac® platforms...that delivers remarkably sharp output... *and* does it all at the lowest price on the market. The fact is, the NEC Silentwriter Model 95 packs more features than any laser printer in its class. Yet it starts at a price the others bargain down to! That's just plain honest. Even more important, it lets you concentrate on what counts: great output that makes you look great. Look, you know your business. Make your own comparisons. Check specs, prices, quality. Once you're ready to hand down your decision...you'll agree it's no contest.

For more information, dial 1-800-NEC-INFO (in Canada, 1-800-343-4418). For immediate information via fax, call NEC FastFacts at 1-800-366-0476 and request #SWM95.

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Because ↑ is the way you want to go. NEC

C&C Computers and Communications

Circle 182 on reader service card

Never Underestimate The Importance of Complete Protection.

—Ouch!

What good is last night's backup if you just lost everything you worked on all morning?

And even if you have a data recovery product, it won't help when you write over a file and then discover you want it back.

And virus protection software is great. If all you have is a virus.

There are dozens of ways to lose data. If you bought a different product to solve every conceivable problem it would cost a fortune. You need PC Tools™.

Only PC Tools gives you complete data protection in one integrated package. All 28 utilities in PC Tools were designed to work together to make using your PC safer, simpler and faster.

With our award-winning Backup you can back up data automatically to just about any device, including all the most popular tape drives. In DOS or Windows.

Need to repair a hard disk? Undelete or repair files? Locate missing data? With PC Tools it's no problem.

And our Virus Protection can detect over 800 viruses on both local and network drives. Before they can cause any damage.

But data protection isn't the only reason PC Tools is a 20-time award winner. You also get Central Point's award-winning PC-Shell,™ Desktop Manager, PC-Cache,™ Commute™ Remote Computing, and dozens of other indispensable utilities.

Call us for the complete story on PC Tools. It makes everything else as outdated as a suit of armor.

1·800·445·4206

Central Point Software, Inc.®

F·A·S·T ◆ F·A·C·T·S

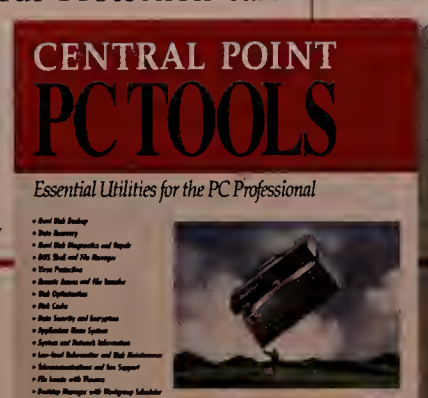
COMPLETE DATA PROTECTION

Backup for Windows & DOS
Disk & File Repair
Undelete with Delete Sentry™
Unformat
Disk Optimizer & File Locate
Virus Protection
Data Encryption & Security

PLUS

Full Windows Compatibility
DOS Shell & File Manager
Disk Cache
Remote Computing
System & Network Info
Desktop Manager

PC MAGAZINE BEST OF 1991 — Jan. 1992
PC WORLD WORLD CLASS AWARD — Oct. 1991
PC WORLD PRODUCT OF THE YEAR 1990 — Feb. 1991



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Circle 52 on reader service card

Remote-Console 3.0

Want to transfer files between your home and office PCs? *Remote-Console* is a remote communications program that links two PCs via modem or direct-cable connection, allowing you to control the host computer from a remote location. Version 3.0 requires only 22K of RAM on the host PC (down from 39K in version 2.2) and 140K on the guest. You can print documents on a printer at the remote site, use the callback feature to reverse phone charges, and set up the host PC to call the remote unit automatically. *Remote-Console 3.0* includes diagnostic software that helps connect the two computers. The price is $99. Remote-Console, P.O. Box 888, Oceano, CA 93445; 805/481-5687.

Reader service no. 651

Primavera Project Planner 5.0

Primavera Project Planner 5.0, an upgrade of the powerful DOS-based project management system, has been redesigned to make it more useful to corporate managers and professionals. The product now lets you handle and interrelate multiple projects simultaneously. In addition, *Project Planner 5.0* now offers six different ways to view and enter data. With improved pop-up windows and context-sensitive help, *Project Planner 5.0* is also more customizable. Projects can be categorized as either master or subprojects, and each project can contain 100,000 tasks and an unlimited number of resources. A custom report writer lets you design your own reports. Graphics output has been improved, so you can combine resource and cost graphics with your schedule, or annotate and modify a graph on screen. *Project Planner 5.0* costs a steep $4000, but upgrades are available free to current users. Primavera Systems Inc., 2 Bala Plaza, Bala Cynwyd, PA 19004; 215/667-8600, 215/667-7894 (fax).

Reader service no. 648

OnTime for Windows 1.1

WINDOWS This *Windows*-based scheduler helps users set up and coordinate appointments. Version 1.1 offers faster performance and is fully compatible with *Windows 3.1,* according to Campbell Services. You can increase the size of your on-screen daily calendar by hiding future-month and past-month calendars and the graphical calendar display (called the allocation grid). *OnTime for Windows 1.1* lets you create an unlimited number of messages per day and displays the ending time for all-day appointments. The price remains $129.95. Campbell Services, Inc., 21700 Northwestern Hwy. #1070, Southfield, MI 48075; 800/345-6747, 313/559-1034 (fax).

Reader service no. 650

Qmodem 5.01

Mustang Software, which purchased *Qmodem* last year from The Forbin Project, has done a major upgrade of this established communications program. New features include an off-line mail reader that lets you download packets of mail from an originating BBS and read the contents off line, according to Mustang. *Qmodem*'s dialing directory is now easier to use and lets you specify the service name, phone number, baud rate, and other information in a directory entry. The program has three new terminal emulations, including IBM 3101, DEC VT 52, and Heath Zenith 19. *Qmodem* costs $99 but will be discounted by major software retailers, according to the company. Mustang Software Inc., P.O. Box 2264, Bakersfield, CA 93303; 800/999-9619, 805/395-0223.

Reader service no. 652

OnTime for Windows lets you increase the size of your daily calendar by hiding future-month and past-month calendars.

The Far Side Calendar for DOS

There's no question that *Windows* programs are generally more pleasing to look at than their DOS counterparts. But if your idea of great visual aesthetics includes dancing cows, degenerate dinosaurs, and fat, nerdy little kids, you no longer have to move to *Windows* to see beauty in your calendar program. That's because Amaze, Inc., has come out with a DOS version of its *Far Side Computer Calendar.* Like the *Windows* version, *The Far Side Computer Calendar for DOS* comes with a perpetual calendar engine, a year's supply of Gary Larson cartoons, and a few animated sequences that play at random. It lists for $69.95. Additional cartoons will be available for $19.95. The program requires Hercules, EGA, or VGA graphics, 540K of RAM, and a taste for the finer things in a very bizarre life. Amaze, Inc., 11810 115th Ave. NE, Kirkland, WA 98034-6923; 206/820-7007, 206/823-0568 (fax).

Reader service no. 653

Data Junction 4.1

Data Junction 4.1 boosts your ability to convert data base, spreadsheet, and other data files to compatible formats. *Data Junction*'s range of supported formats in its standard ($99), professional ($199), and advanced ($299) programs has always been impressive. With version 4.1, *Data Junction* has added support for 17 popular data files, including *WordPerfect 5.0* and *5.1, c-tree Plus, FoxPro, Excel 3.0, Q&A 4.0, Novell Xtrieve, NetWare SQL, Informix-On-Line, SAS, Magic PC, Solomon* accounting series, *Great Plains Accounting Series, Peachtree Accounting, CA ACCPAC Plus, Macola* accounting series, and Micro Focus COBOL. Version 4.1 has improved support for 58 file formats, including *dBASE, 1-2-3,* binary and mainframe/EBCDIC data, *DAC, Platinum,* and *SBT.* Tools & Techniques Inc., 1620 W. 12th St., Austin, TX 78703; 800/444-1945, 512/482-0976 (fax).

Reader service no. 654

New Version!

"Have you driven dBASE lately"

The new 1.5 model of dBASE IV is here

And it's loaded with more standard features. Like mouse support for easy maneuvering through applications. Multi-file view editing for direct updating. Query By Example (QBE) summary operators and pick lists for increased operations. And automatic installation of complex programs and configurations. So whether you're a first-time buyer or a dBASE expert, you can quickly get the best out of dBASE IV v1.5.

Mouse support

Increased performance for faster results

Shift into the information you need sooner with the dBASE IV v1.5 new optimization technology—IQ!.™ Now dBASE has three different ways of retrieving data and will automatically choose the fastest one for you.

Superior programmability for complex applications

Now up to 40 open work areas are possible at any one time, offering greater flexibility for more complex applications. Enhanced BLANK support gives you the power to detect empty fields for data validation and statistical operations. Plus, the widely respected dBASE Template Language is now standard in dBASE IV v1.5.

IQ! technology

A great product begins with the basics

Behind the new features of dBASE IV v1.5 lies the flexibility of a worldwide standard. No other database software is available on more platforms than dBASE. Add that to the dBASE Control Center with its road-tested design tools and the dBASE Programming Language, featuring integrated IBM's SAA-compliant SQL, integrated debugger, and built-in applications generator, and you have the most well-rounded database management and application development product in the world.

Technology you can build upon

There are no stop signs ahead for dBASE IV v1.5 thanks to its Open Architecture Control Center, allowing you to add third-party designers to your crew—and access additional tools—at any time.

Borland: the new force behind dBASE

dBASE IV v1.5 marks a return of innovation and pride to the dBASE community. And now that dBASE IV v1.5 is part of the Borland family, you can expect Borland's world-renowned service and support. Now is the time to join the more than three million people who already drive dBASE.

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- Editable multi-file view
- Calculated field linking
- QBE summary operators & pick lists
- Automatic install
- New optimization technology—IQ!
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- "INDEX" functions
- 40 work areas
- Template language included
- Enhanced BLANK support
- Browse/edit organize menu toggle
- Conditional compilation
- Low-level file I/O
- Open Architecture Control Center
- Enhanced RUN function

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Guardian Utilities 1.2 for Windows

WINDOWS With *Guardian Utilities, Windows* users are able to run four virtual *Windows* screens to quadruple their display space. Now users can more easily find and switch between applications running in these windows. Version 1.2 includes buttons in each view, as well as hot keys, that allow you to switch between these virtual windows in a flash. With other hot keys, you can add the electronic equivalent of sticky notes, maximize a virtual window, and move the current window to a different quadrant. *GU 1.2* costs $19.95 and requires 130K of hard disk space. It also includes a variety of animated wallpaper and a secure screen blanker. Zeus MicroSystems Inc., P.O. Box 6143, San Rafael, CA 94903-0143; 800/727-2703, 415/491-1737.

Reader service no. 655

FaceLift 2.0

FaceLift, Bitstream's type-scaling font package, lives up to its name with a major overhaul that features an entirely new interface. *FaceLift* comes with 16 fonts in Bitstream's own Speedo format, and it also throws in 16 Type 1 PostScript fonts—the format that comes with *Adobe Type Manager* (*ATM*). Like *ATM, FaceLift* allows you to generate these fonts in virtually any point size, both on screen and on the printed page. What sets *FaceLift* apart, however, is its capability to manipulate type: You can apply fills, shadows, and other interesting special effects to entire typefaces, and a preview mode lets you examine the results of your handiwork before you plunge ahead. Bitstream has also addressed the speed problems that dogged *1.2;* in preship tests of *2.0,* the company claimed speeds comparable to those of *ATM* and *Windows 3.1* TrueType on an HP LaserJet. Previous *FaceLift* customers can upgrade for $39.99, and an upgrade from competing packages is $49.99. New buyers must pay $99. Bitstream, Inc., 215 First St., Cambridge, MA 02142; 800/522-3668, 617/868-4732 (fax).

Reader service no. 656

AllType for Windows

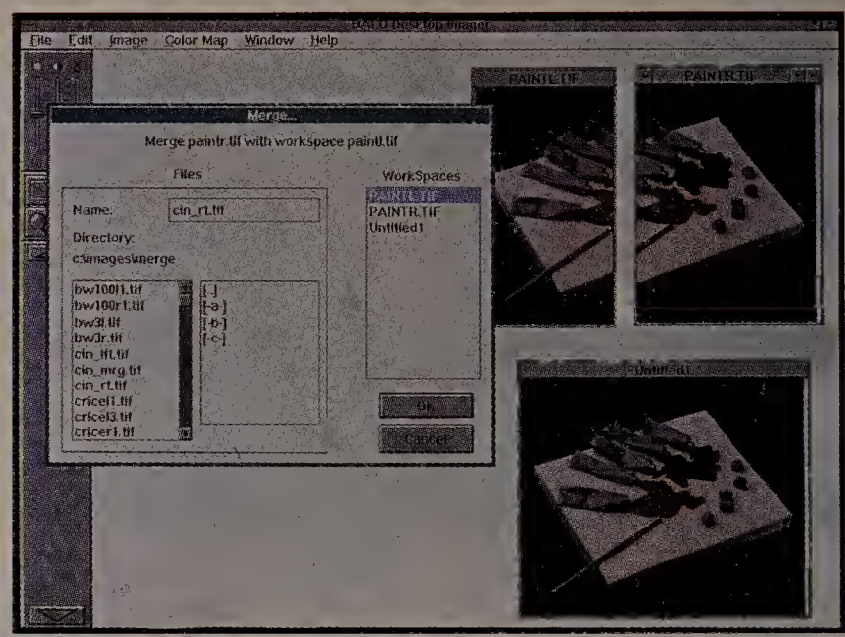
WINDOWS Moving up to *Windows 3.1* and its built-in TrueType fonts doesn't mean leaving all your old typefaces behind. Atech's *AllType* font conversion utility now lets you convert your existing font outlines into TrueType. The $79.95 package lets you swap between Adobe PostScript Type 1 or Type 3, Bitstream Fontware, Agfa Intellifont, Nimbus Q, and other formats—all from the comfort of *Windows.* You can modify fonts, altering weight, angle, and leading to create a custom look. Atech Software, 5964 La Place Ct. #125, Carlsbad, CA 92008; 800/786-3668, 619/438-6898 (fax).

Reader service no. 657

FontBank Type Companion

Looking for a way to spice up your presentations, marketing brochures, and ads? *FontBank Type Companion* gives you the most font flash for your cash. This collection of 250 scalable display typefaces costs only $95—a fraction of the cost of most typeface sets. *FontBank* is available in Adobe PostScript Type 1 and TrueType formats, and it installs directly into *Windows* via *Adobe Type Manager* or the *Windows 3.1* font manager. DOS users will need to purchase a conversion utility such as Atech's *AllType* or *Adobe Type Foundry.* FontBank, Inc., 2620 Central St., Evanston, IL 60201; 708/328-7370, 708/328-7491 (fax).

Reader service no. 658



Halo Desktop Imager's AutoStitch feature automatically merges multiple scans into a single seamless image.

Halo Desktop Imager

Using a portable scanner on large page sizes has always required patience and a steady hand. But with the AutoStitch capabilities added to Media Cybernetics' *Halo Desktop Imager* scanner utility, large paper is no longer a problem. Now you can assemble two or more scans into one seamless image—a boon for hand-scanner users and anyone who needs to create images larger than 8½ by 14. *Halo* uses artificial intelligence technology to identify and join contiguous areas of the scans, or users can guide the process manually. The $139 utility allows you to convert files, adjust color values, and compress images. Media Cybernetics Inc., 8484 Georgia Ave., Silver Spring, MD 20910; 301/495-3305, 301/495-5964 (fax).

Reader service no. 659

Media Vision Audio Port

WINDOWS It may not be *The Sound of Music,* but for presenters who want to add a dynamic quality to their road show, Media Vision's Audio Port makes it possible to play and record audio files easily through your notebook. This lightweight device is the size of a deck of cards and snaps into the parallel port of your PC, PS/2, or portable computer. It comes with a built-in speaker and jacks for microphones and speakers. A multitimbral FM synthesizer ensures decent sound quality. The Audio Port was designed with the *Windows 3.1* sound recorder facility in mind. As a result, Media Vision expects the Audio Port's microphone feature will be used not only in presentations but also to annotate documents and E-mail. The Audio Port runs on 4 AAA batteries or AC power. List price is $199. Media Vision Inc., 47221 Fremont Blvd., Fremont, CA 94538; 510/770-8600, 510/770-8648 (fax).

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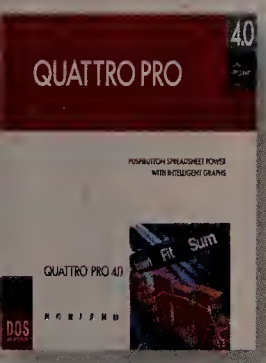
For more information about any product, contact the manufacturer or circle the number on the reader service card.

Introducing Quattro Pro 4.0 The only DOS spreadsheet with pushbutton power!



Borland does it again– Sorry, Lotus!

No other DOS spreadsheet gets your work done faster than Borland's new Quattro® Pro 4.0 with pushbutton power!

Quattro Pro beats 1-2-3 . . . again!

New	Quattro Pro 4.0	Lotus 1-2-3 R 2.3	Lotus 1-2-3 R 3.1+
Most Powerful	**Yes**		
Intelligent Graphs	Yes	No	No
Novell Network optimized	Yes	No	No
Multiple sheets	Yes	No	Yes
Multi-variable solver	Yes	No	*
Easiest to Use	**Yes**		
SpeedBar	Yes	No	No
Print-To-Fit	Yes	*	*
Read Lotus 1-2-3 files, styles & macros	Yes	Yes	Yes
Best Performance	**Yes**		
All features in 640K	Yes	?	No
Price	**$495**	**$495**	**$595**

? Yes, but almost no room remains for data.
*Yes, but requires attaching an add-in.

NEW SpeedBar

Quattro Pro's customizable, built-in SpeedBar™ is a row of clearly labeled buttons that use simple English commands to give you instant mouse-click access to your frequently used features and macros.

Plus you get immediate access to a host of new features.

NEW Intelligent Graphs

Intelligent Graphs let you perform extended analysis with your graphs without changing your data. And Quattro Pro's Optimizer™ allows you to solve complex problems using multiple variables.

NEW Novell Support

The best spreadsheet on networks

Only Quattro Pro 4.0 gives you superior Novell NetWare support, including automatic logon, drive mapping and a new Print Queue Manager.

The most feature-packed DOS spreadsheet ever!

And in addition to Quattro Pro 4.0's dramatic new advances, you get the features that have made it the #1-rated spreadsheet in the world. Features such as WYSIWYG, Print-To-Fit™ spreadsheet output, superb 1-2-3® compatibility (you can even read Allways, Impress and WYSIWYG files) and more.

Top-rated spreadsheet Top-rated company

Quattro Pro has won more awards for technical excellence and customer satisfaction than any other DOS spreadsheet. In fact, in the prestigious J.D. Power and Associates® survey, Borland was ranked #1 (tied) for Application Software Publisher in Customer Satisfaction Among Business Users.[1]

Now you know why more than one million people have upgraded to the power of today's spreadsheet. Quattro Pro.

Attention 1-2-3 users!
Step up now!
Special Upgrade offer
See your dealer today or call now, 1-800-331-0877, Dept.5645

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Software Craftsmanship

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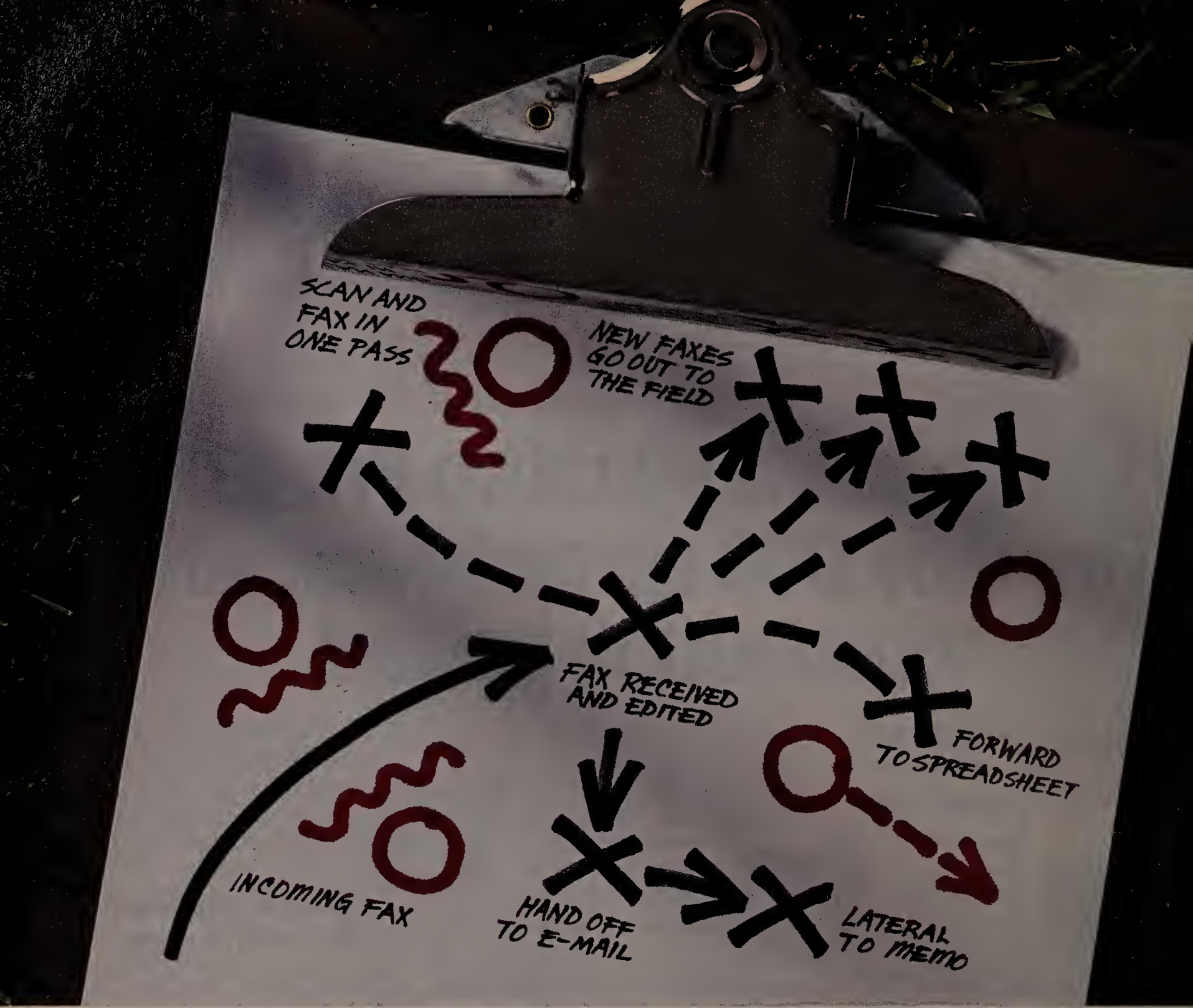

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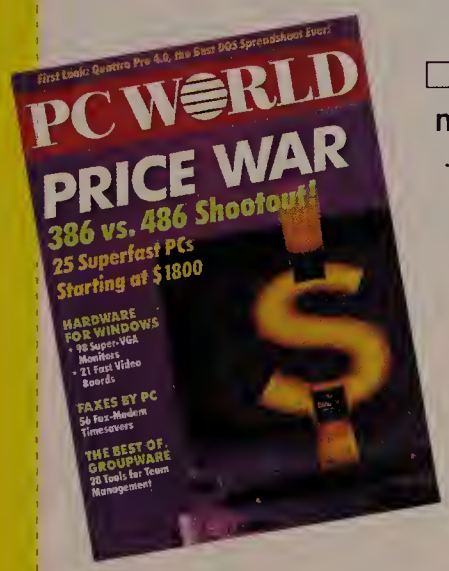

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Edited by ERIC BENDER

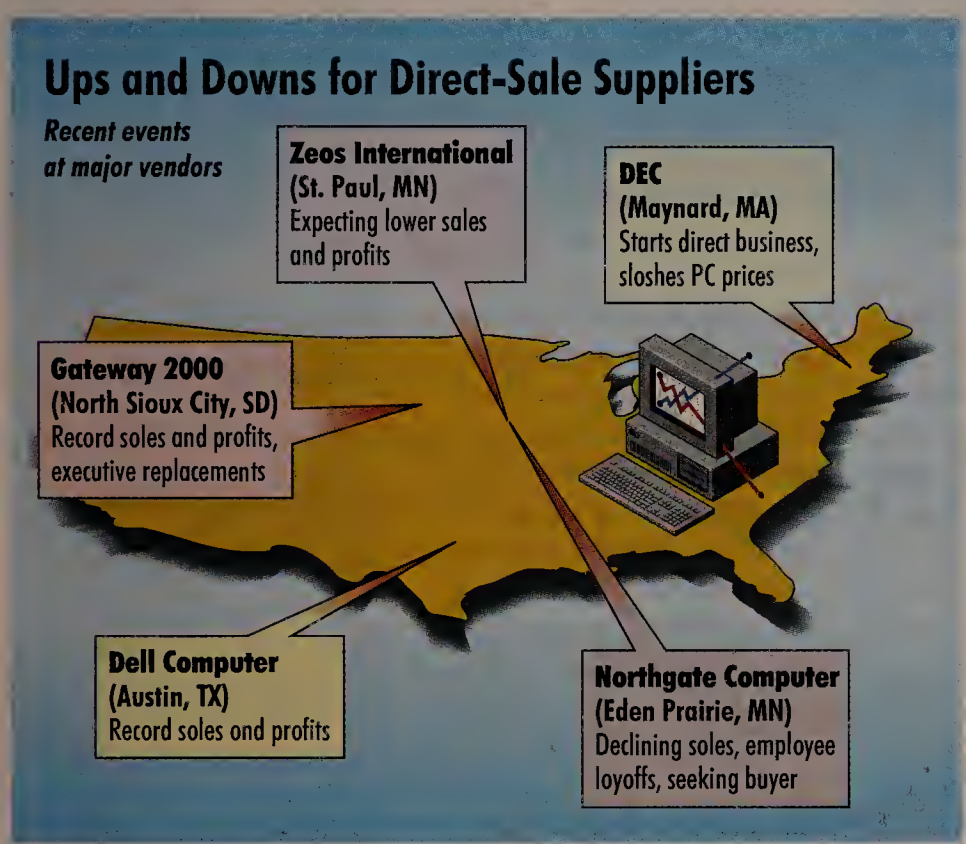
Turbulence Hits Direct-Sale Firms

Record Sales Attract Steady Stream of Major New Competitors

While Dell and Gateway post record sales and earnings, not all direct-sale PC vendors are so fortunate. Blame it on a soft economy, cutthroat pricing, new players jumping on the bandwagon, strategic mistakes, or even too-rapid growth, but Northgate and some others are making headlines as much for their business ups and downs as for their products.

The most worrisome news came from Northgate in Eden Prairie, Minnesota. With declining sales and a $1 million fourth-quarter loss, Northgate laid off 100 people, froze salaries, and cut costs in the hope of staying afloat long enough to attract an investor or buyer. Despite its troubles, the firm ended the year in the black with record net earnings.

Other headlines have been more thought provoking than dramatic. For example, Zeos Int'l of St. Paul warned Wall Street that profits will dip in the first quarter. And despite its successful year, in North Sioux City, South Dakota, Gateway experienced a flurry of executive turnover.



It's the best of times and the worst of times for direct-sale PC vendors. Some, such as Dell and Gateway, flourish, while others stumble.

A Direct Effect?

The troubling news is hardly restricted to direct-sale suppliers. For instance, IBM's PC sales were dismal in 1991, and Toshiba AmericaInformation Systems of Irvine, California, cut 9 percent of its PC work force earlier this year.

But analysts say direct-sale vendors that grow quickly may fall just as quickly. These companies typically operate on narrow profit margins and can get into serious difficulty in a big hurry, points out Steve Lair, an analyst with Dataquest in San Jose, California. If a direct-sale supplier doesn't have solid financial reserves (like those that saw Austin-based Dell through a rough time in the late eighties), "it really has very little backup plan," says Lair.

Today's all-out PC pricing battles are likely to heighten the risk. And to intensify competition further, major traditional vendors are finally jumping on the direct-sale bandwagon.

Digital Equipment Corporation has already splashed its way in with high-profile ads and aggressive pricing, Zenith Data Systems is selling through a toll-free number to corporate accounts, and virtually every PC heavyweight except Compaq has quietly acknowledged its plans to enter this distribution channel.

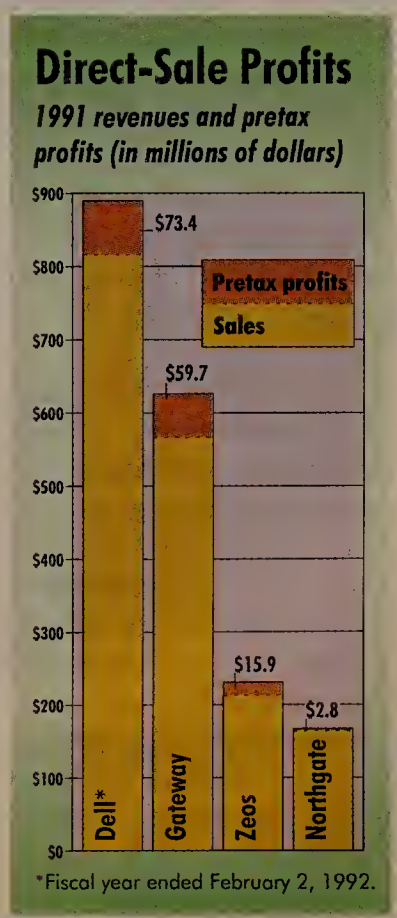
Purchase Protection

"With all the financial difficulties Northgate has been going through, in spite of its technical awards, I'm very leery," says Ben Helfer, network assistant for Harpo Studios, Oprah Winfrey's production company in Chicago. "It's unfortunate, because I'd like them to get back on their feet . . . but it just can't be at my expense."

As a precaution, Helfer reads computer trade weeklies to keep tabs on vendors' financial happenings. He also employs a local computer maintenance company to service Harpo's 80-plus PCs.

A bad quarter or a layoff shouldn't automatically rule out a purchase, notes Ron Jett, president of California Filtration in Westminster, California. "A lot of companies are streamlining," he remarks, and layoffs have grown common. But Jett advises that if a vendor is in serious financial trouble, customers would be wise to stay away—unless perhaps the vendor "is offering a great price and users think they can have the machines serviced by somebody else."

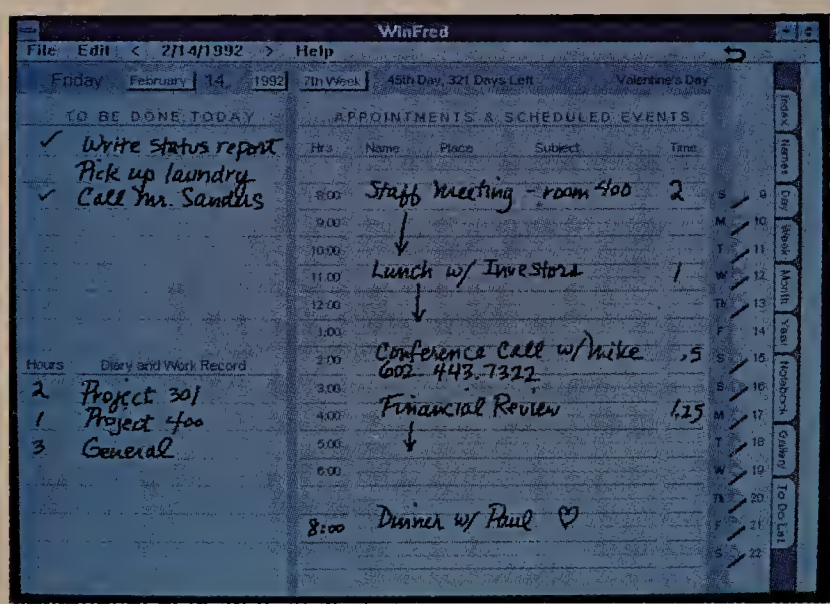
—*Jeff Bertolucci*



Except for Northgate, which posted a fourth-quarter loss, leading direct-sale vendors enjoyed higher sales and profit margins last year. But this year even leader Dell is slashing expenses, as falling PC prices squeeze profits.

Is This the Year of the Pen?

Limited Hardware, Lack of Applications Delay Acceptance



Slate's Day-Timer Pen Scheduler lets you store and retrieve information more quickly and flexibly than a paper equivalent would.

Stop us if you've heard this one: In the future, computers will be fast, cheap, and small enough to carry around with you. Everyone will have one. And instead of using a keyboard or a mouse, you'll be writing on your PC with a pen.

This past April, Go Corporation and Microsoft Corporation took a big step toward making this vision a reality by releasing their respective pen operating systems. Has the future finally arrived?

Not exactly. Tablet-size PCs capable of running these systems are still scarce and expensive—starting around $3000. Early adopters will likely be large corporations in vertical markets such as banking, insurance, and health care that can afford the high hardware premium. "1992 will be a year of evaluation on a wide scale," predicts Marsha Mason, spokesperson for Go in Foster City, California.

Pointing Toward Windows

Chief among the decisions facing buyers will be choosing an operating system: Microsoft's *Windows for Pen Computing* or Go's PenPoint.

Microsoft claims its pen system will run existing *Windows* applications without a hitch. *Windows for Pen* shows the familiar *Windows* interface but substitutes a pen for the mouse. As with PenPoint, you use a series of simple pen strokes (called *gestures*) to add and edit text, select commands, and move objects around on screen. The system can translate hand-printed characters into machine-readable text or store them as electronic "ink."

Bob Schiewe, senior vice president in operations for Continental Bank in Chicago, has a simple reason for choosing *Windows for Pen*. "It's easy to use, and we're very familiar with it—we're already using [*Windows*] on our desktops." In an experimental program, Continental is planning to outfit a handful of its sales representatives with NCR's tablet-size 3125 Notepads and *Windows for Pen*. Managers will visit client sites, jot down information, and upload it through a modem into the bank's mainframes. "Using pen PCs will let us bypass delayed phone calls and misread messages, eliminate paper, improve quality, and decrease turnaround time," according to Schiewe.

Do Not Pass Go

Unlike *Windows*' standard file and application approach, Go's PenPoint interface looks like a paper notebook. Documents are listed inside a table of contents; to open one, simply tap on it with the pen. Instead of running programs, you select different types of "paper" to accomplish tasks like taking notes, crunching numbers, or sending faxes. Such applications must be written specifically for PenPoint, and Go expects more than 20 to be available this spring.

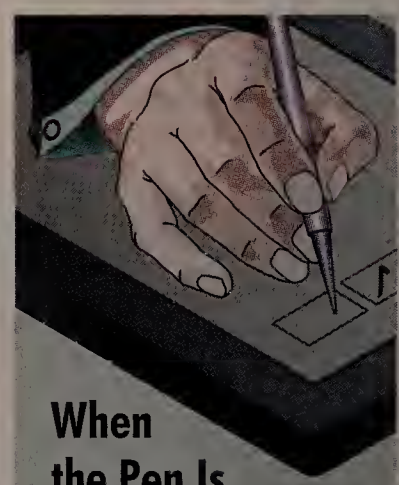
Steve Hanna, vice president of hotel systems for Marriott Corporation in Washington, D.C., is evaluating PenPoint-based PCs for serving hotel guests, making group sales, and helping out in the corporate offices. "We like the notebook metaphor," says Hanna. "It's easier for our executives to relate to—especially senior management, which doesn't use computers a lot."

Wait Till Next Year

Analysts expect a wave of 386-powered pen tablets this summer. "We'll see at least one paperback book–size 386 by the end of the year," says Portia Isaacson, founder of The Dream IT, a market research firm in Cambridge, Massachusetts. Such machines would probably cost around $2000.

But the real tsunami won't hit until the first quarter of 1993, when hand-held 8086-based PCs are expected to flood the market. (Lacking the horsepower for PenPoint or *Windows for Pen*, they'll run other pen operating systems.) "Personal digital assistants priced around $700 will be very big in early '93," says Bill Lempesis, editor and publisher of *PenVision*, a Pleasanton, California, newsletter. He expects 2.6 million pen PCs to sell worldwide next year.

Despite the delays, user enthusiasm remains high. "These pen PCs," says Continental's Schiewe, "let our people do what they've been naturals at since they were 5 years old." —*Daniel Tynan*



When the Pen Is Mightier Than the Keyboard

Who benefits most from pen PCs

Mobile sales pros

- ☑ carry electronic brochures and price lists
- ☑ create custom invoices and contracts
- ☑ process orders via modem or wireless LAN

Field service personnel

- ☑ store and search technical manuals on disk
- ☑ fill in forms electronically
- ☑ capture and annotate digital photos

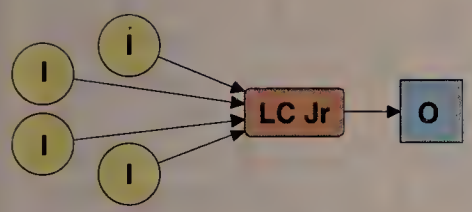
Traveling executives

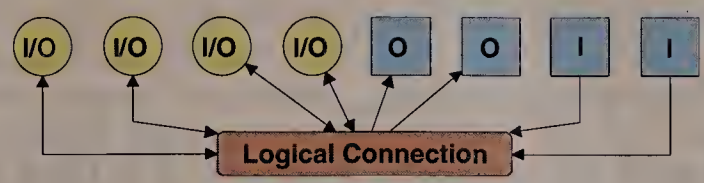
- ☑ record and retrieve notes without typing
- ☑ update personal calendars and phone books
- ☑ generate expense reports easily

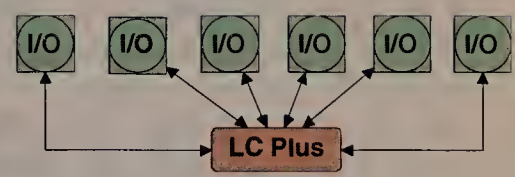
Pen PCs promise to combine desktop-PC power with the ease of paper and pencil. They aim to go where no PC has gone before, accompanying the 30 million mobile professionals who don't yet use PCs.

Printer Sharing

= PARALLEL DEVICE = SERIAL DEVICE = PARALLEL OR SERIAL DEVICE I = INPUT FROM PC O = OUTPUT TO PERIPHERAL

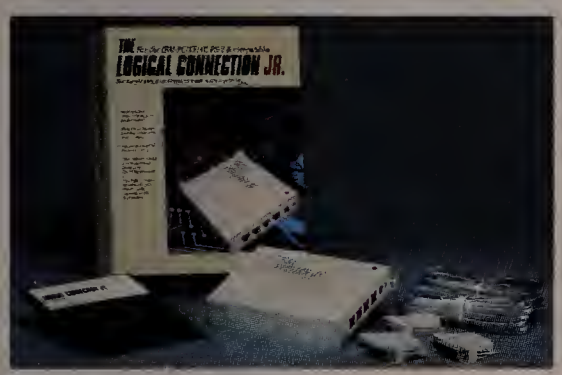






LC Jr.-256Kb $239

Serially connect up to four PCs to the **Logical Connection Jr.** at speeds up to 115,200 bps. It will automatically convert the data for easy sharing of one parallel printer.



LC-512Kb $495

The **Logical Connection** has eight ports: four bi-directional serial ports which can be set as input or output, two parallel inputs and two parallel outputs.

LC Plus-512Kb $695

All six ports of the **Logical Connection Plus** are automatically configured as parallel or serial, and input or output. Versatility and high speed are key features.

- **UL Listed Power Supplies**
- **FCC Class B Certification (LCJr. - A)**
- **Fast Data Input and Throughput**
- **Socketed DRAM Upgrades to 1Mb**
- **Largest Selling PSDs in the USA**

Logical Connections allow several users to easily share expensive printers and other resources. Choose the peripheral that you need with a pop-up menu or ASCII string.

Multiple users can send data simultaneously since Logical Connections with memory will buffer and queue jobs on a first-in-first-out basis. A 256Kb buffer will hold up to 100 pages of text or about 5 - 10 pages of graphics data.

If your company has a LAN, use Logical Connections for local printer sharing in smaller workgroups, rather than printing centrally through the LAN. Local printing is more convenient and more secure!

LC -41PAS $100

Smart switch to automatically connect up to 4 parallel inputs to 1 parallel output.

SPPS $60

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LOGICAL CONNECTION 800-238-9415 US & Can.

Laptop Memory

Macintosh Powerbook 100 (Dealer must install)

Memory Module	EPB-2000	2 Mb	$275
Memory Module	EPB-4000	4 Mb	$500

Macintosh Powerbook 140/170 (Dealer must install)

Memory Module	EPC-4000	4 Mb	$500
Memory Module	EPC-6000	6 Mb	$750

Toshiba Laptop Models: (User may install)

1000SE/XE/LE, 2000, 2000SX (All Sizes); 2000SXE, 2200SX (exclude 1Mb)

Memory Card	RCT-1000	1 Mb	$150
Memory Card	RCT-2000	2 Mb	$200
Memory Card	RCT-4000	4 Mb	$400
Memory Card	RCT-8000	8 Mb	$700

PC-MCIA 2.0 / JEIDA SRAM (User may install)

For Laptops conforming to this new universal spec.

Memory Card	RJB-0512	512 Kb	$195
Memory Card	RJB-1000	1 Mb	$450
Memory Card	RJB-2000	2 Mb	$750

Circle 126 on reader service card

Making PCs Environmentally Correct

Green PC Activists Say Turn Off Idle PCs, Maximize Nets, Fax Smart

With forests disappearing, landfills running out of space, and energy costs soaring, what role does the PC play in the breakdown of the environment? And what can users do to help conserve natural resources?

The estimated 42 million PCs and 7 million laser printers humming away in offices nationwide have a significant impact. Printers and copiers consume some 14 million tons of paper a year—that's 238 million trees. Building owners and utility companies have also discovered that the PC and its minions have boosted power consumption in some offices by 600 to 1000 percent.

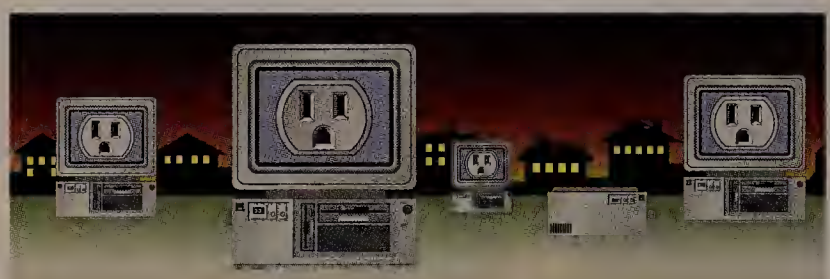
So what can you do *now* to save trees, save energy, and be otherwise ecologically correct—and also save money? Engineers, PC gurus, and recycling advocates say it comes down to the environmentalists' mantra of "reduce, reuse, and recycle."

• When in doubt, turn it off! Switch off your PC and peripherals at the end of the day and when you're away for extended periods. If your laser printer won't be used for 3 hours or more, shut it off, says Rich Smith, an engineering manager at Hewlett-Packard's Boise, Idaho, printer group. Steve Gibson, developer of *SpinRite* in Laguna Hills, California, suggests a simpler approach: "Turn everything on and off once a day—remember, PCs aren't like coffeepots."

• Use recycled paper in your printer and copier. Recycled paper is problem free as long as it's heavy enough for the machine.

• Use both sides now. "Print duplex on your laser printer, and use the double-sided mode on your office copier. You won't halve your paper bills, but the savings can be substantial," says Bruce Nordman, research associate at Lawrence Berkeley Laboratory in Berkeley, California. HP's Smith suggests using at least 20-pound stock and letting the paper cool before you reinsert it to avoid paper jams.

• Recycle and reuse printer supplies. Both HP and Lexmark promote toner cartridge recycling by giving customers prepaid shipping labels. Jane Bell, head of HP's "green" programs in Boise, says metal parts are reused immediately, while the plastic shells are ground up, melted, and molded into new casings. Dot matrix printer owners can do even more. "If your dot matrix printer uses cloth ribbons, you can buy a simple reinking device and use the ribbon 20 to 40 more times," says Don Rittner, author of *EcoLinking: Everyone's Guide to Online Environmental Information* (Peachpit Press, Berkeley, California, 1992).



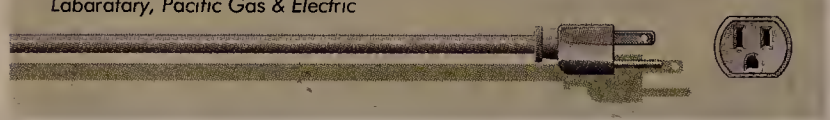
PCs, Printers Draw Major Power Load

Total U.S. power consumption by Intel-based PCs (with monitors) and laser printers, assuming 2550 hours of use per year

Installed base	Energy used per year (kilowatt-hours)	Equivalent in home heating/air-conditioning
42 million PCs	14.4 billion[1]	1.75 million homes
7.3 million printers	3.8 billion[2]	0.46 million homes
Total	**18.2 billion**	**2.21 million homes**

[1]Assumes average load of 115 watts for 8088/8086, 131 watts for 80286, 129 watts for 80386SX, and 187 watts for 80386DX PCs.
[2]Assumes average load of 205 watts.

Sources: Hewlett-Packard, International Data Corporation, Lawrence Berkeley Laboratory, Pacific Gas & Electric



Estimates indicate U.S. PCs and printers draw enough power to heat and air-condition more than 2 million typical U.S. homes.

Working Smart—And Green

• Fax smart. For starters, fax instead of using couriers. "A fax uses far less energy than an airplane," notes Richard Heede of the Rocky Mountain Institute in Snowmass, Colorado. Next, get a plain-paper fax machine instead of an admittedly cheaper thermal unit—at least it can use recycled and recyclable paper. But many PC mavens contend the ultimate solution is a fax board.

• Network your office to the max. "Don't give everyone a laser printer or modem or fax board—all these individual peripherals eat up energy and your budget," says Steve Gibson. "Network your office and have people share centralized peripherals." Promote the paperless office by keeping frequently updated information on line instead of on paper.

• Buy smart. "Ask yourself, Do I really need a laser printer? Or will an ink jet—which uses far less power—do the job?" says Jeff Harris, a staff scientist at Lawrence Berkeley Laboratory. Almost everyone surveyed agrees that your next PC should be a portable. "They consume a tenth of the energy of a desktop PC," says Harris.

• If your organization permits it, work at home one day a week, says Rocky Mountain's Heede. "You'll save gas—and you'll be more productive."

—*Robert Luhn*

Robert Luhn and Daniel Tynan are contributing editors for PC World.

Cut Electric Bills With LAN Printers

Estimated power savings by networking printers

Change
Replace 39 laser printers with 6 networked lasers

Savings
5243 kilowatt-hours per year or about $525 per year*

Change
Decrease on-time of 39 printers by one-third

Savings
6788 kilowatt-hours per year or $680 per year*

*Assumes 39 printers that draw 205 watts are on 50 hours per week, 51 weeks per year, with half the printers powered up at one time. They are replaced by 6 faster networked printers that use 300 watts and are on continuously.

Sources: Pacific Gas & Electric; PC World calculations

Pacific Gas & Electric informally studied an office with 39 laser printers and found that converting to 6 network printers brought major savings.

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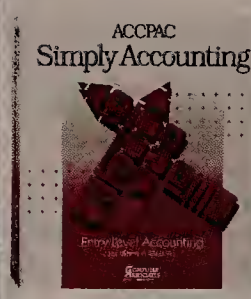

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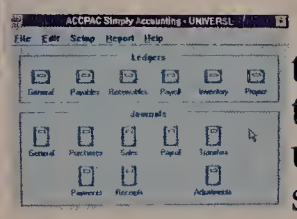

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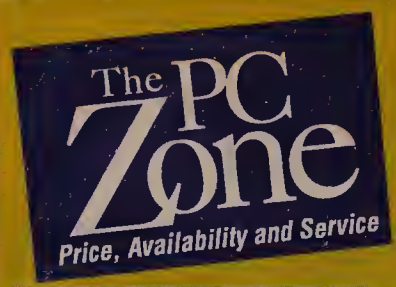

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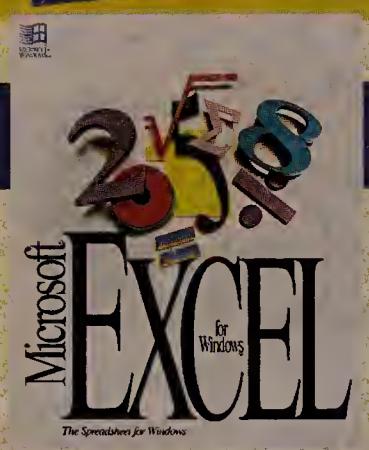

Microsoft Excel 4.0 for Windows Upgrade $89.88

The leading spreadsheet for the Windows environment just got even better. It gives you access to more powerful features and makes everyday spreadsheet tasks easier than you ever dreamed possible. Now, for a limited time, you can upgrade from Excel 3.0 to Excel 4.0 at a special price. Microsoft Corp. • #07755 - 5.25" disk • #07756 - 3.5" disk

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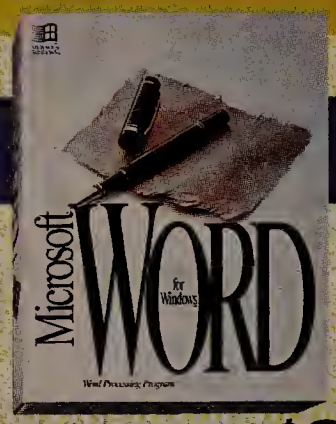
Microsoft Excel 4.0 #07757 ..... $298



Microsoft Word for Windows 2.0 $309

Power up to Word 2.0 for Windows, the leading word processor designed for Windows. It makes everyday work easy. Tables, bullets, charts, columns and drawings—they're all just a click of the mouse away! You can create envelopes or check your spelling with a mouse click, too. Microsoft Corp. #09974

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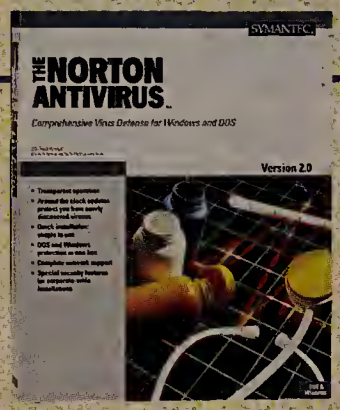

Norton Antivirus 2.0 $88

The Norton AntiVirus is the most comprehensive solution available for Windows and DOS to prevent viruses from infecting your PC. It detects over 940 different types of viruses and repairs or helps you remove infected files efficiently and completely. Virus protection is transparently done in the background while you work. Symantec #07181

Adobe Illustrator 4.0 Bundle w/Streamline $394

Adobe Illustrator 4.0 offers a complete professional illustration solution for the PC environment. The bundle includes **FREE** Streamline, a powerful design utility which converts bitmapped images into high-quality PostScript artwork. Includes a generous selection of Adobe patterns, textures, symbols and borders. Adobe #07764

Microsoft Windows 3.1 & Norton Desktop for Windows 2.0 Bundle

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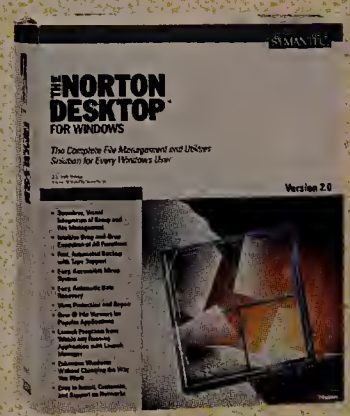

PC Pivot $988

The Full Page Pivot Display is the first full-page color display for the PC that shows you a full page at one time in both portrait and landscape models. 100% VGA, SVGA ar Windows compatible. Anti-glare screen, tilt swivel ba low ELF/VLF. Radius #07701

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Win Games #09955 ..... $24

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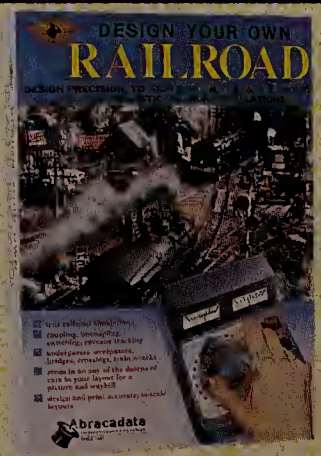

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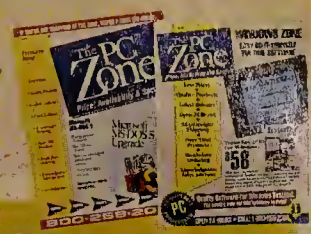

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Bargains of the Month

The AST Premium II 486/33 and the Dell System NX20 were the most aggressively priced desktop and portable PCs in the March survey by International Data Corporation.

Best-Sellers

Leading PCs sold through computer stores and traditional dealer channels

1 *IBM PS/2 Model 55 SX*	6 *Compaq Deskpro 386/25M*
2 *IBM PS/2 Model 70 (20 MHz)*	7 *Compaq Deskpro 386s/20*
3 *IBM PS/2 Model 57 SX*	8 *CompuAdd 316s*
4 *NEC PowerMate SX*	9 *Toshiba T2200SX*
5 *Compaq LTE 386s/20*	10 *IBM PS/2 Model 35 SX*

Toshiba's T2200SX notebook joins Compaq's LTE 386s/20 at the head of the portable pack, according to the February survey by InfoCorp/Computer Intelligence's Storeboard service.

Over the Counter

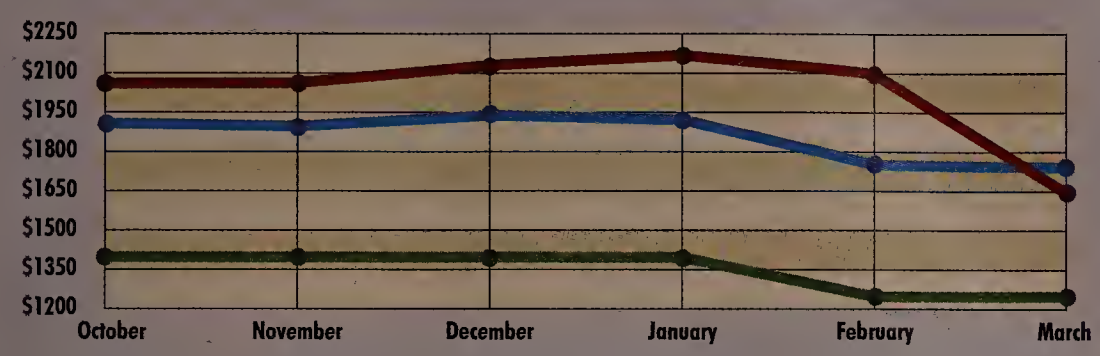
What you pay at retail stores for popular PCs

	Configuration				National				
	Speed (MHz)	RAM (MB)	Hard disk (MB)	Video adapter	List	Average	Boston	Chicago	Dallas/Ft. Worth
80386SX-based desktop PCs									
AST Bravo 386SX/20	20	2	40	VGA	$1695	$1404	$1474	$1404	$1400
Compaq Deskpro 386s/20	20	2	60	VGA	$1899	$1646	$1612	$1682	$1587
Dell System 320 SX	20	2	40	VGA	$1250	$1250	$1250	$1250	$1250
IBM PS/2 Model 35 SX-043	20	2	40	VGA	$2255	$1744	$1827	$1723	$1749
IBM PS/2 Model 56	20	4	80	VGA	$3030	$2406	$2603	$2301	$2278
NEC PowerMate SX/20i	20	2	60	VGA	$2049	$1599	$1627	$1714	$1515
80386DX-based desktop PCs									
AST Premium II 386/33	33	4	210	VGA	$3795	$3092	$3298	$3137	$3016
Compaq Deskpro 386/25M	25	4	120	VGA	$3199	$2843	$2591	$2987	$2696
Dell System 333P	33	4	100	VGA	$1630	$1630	$1630	$1630	$1630
Epson Equity 386/25 Plus	25	2	100	VGA	$3199	$2472	$2719	$2799	$2470
Gateway 2000 33-MHZ 386VGA	33	4	200	VGA	$1845	$1845	$1845	$1845	$1845
IBM PS/2 Model 70-A16	25	4	160	VGA	$5475	$4044	$4484	$3969	$3945
80486SX-based desktop PCs									
ALR BusinessVEISA	20	5	120	none	$3495	$2863	$2985	$2923	$2764
AST Premium II 486SX/20	20	4	80	VGA	$3495	$2825	$2797	$2986	$2799
Compaq Deskpro 486s/25M	25	4	120	VGA	$3699	$3298	$3098	$3474	$3142
IBM PS/2 Model 90XP-OH9	25	4	160	XGA	$6545	$4984	$4976	$4881	$4856
80486DX-based desktop PCs									
AST Premium II 486/33	33	4	210	VGA	$4495	$3776	$4312	$3990	$3553
Compaq Deskpro 486/33M	33	4	340	VGA	$5499	$4902	$4537	$5442	$4670
IBM PS/2 Model 90 XP-OKF	33	8	400	XGA	$12,495	$9403	$10,027	$9299	$9456
NEC PowerMate 486/33e	33	4	300	none	$6274	$4888	$5074	$5282	$4661
Portables/laptops									
AST Premium Exec 386SX/20	20	2	40	VGA-LCD	$2395	$2024	$2071	$2058	$2051
AST Premium Exec 386SX/25	25	4	80	VGA-LCD	$3295	$2816	$2827	$2862	$2789
Compaq LTE/286	12	640K	20	CGA-LCD	$1949	$1573	$1608	$1655	$1617
Compaq LTE 386s/20	20	2	30	VGA-LCD	$3599	$3009	$2949	$3117	$3111
Dell System NX20	20	2	60	VGA-LCD	$1799	$1799	$1799	$1799	$1799
IBM PS/2 Model L40 SX	20	2	60	VGA-LCD	$3645	$2593	$2920	$2469	$2464
NEC UltraLite SL/20	20	2	80	VGA-LCD	$3799	$3015	$3260	$3220	$2972
Ti TravelMate 2000	12	1	20	VGA-LCD	$1199	$969	$1037	$964	$947
Toshiba T2000SX	16	1	40	VGA-LCD	$2699	$2059	$2062	$2203	$1998
Toshiba T2000SXe	20	2	60	VGA-LCD	$3299	$2610	$2570	$2815	$2665

From an IDC survey of more than 180 computer dealers in eight metropolitan areas. Figures based on at least four price quotes for each machine. Prices are based on manufacturer's standard configuration without monitor.

Trend Line: 20-MHz SX Machines Slip

National average street price for selected PCs with 2MB RAM and 40MB or 60MB disks



Prices of 20-MHz SX machines held steady until midwinter, when a series of price cuts began. Such PCs are now bought in high volume as the basic platform for entry-level business desktops. Customers wanting to run Windows would be wise to buy models with more memory and disk storage and should consider units with much more powerful CPUs that cost only a few hundred dollars more.

Metropolitan

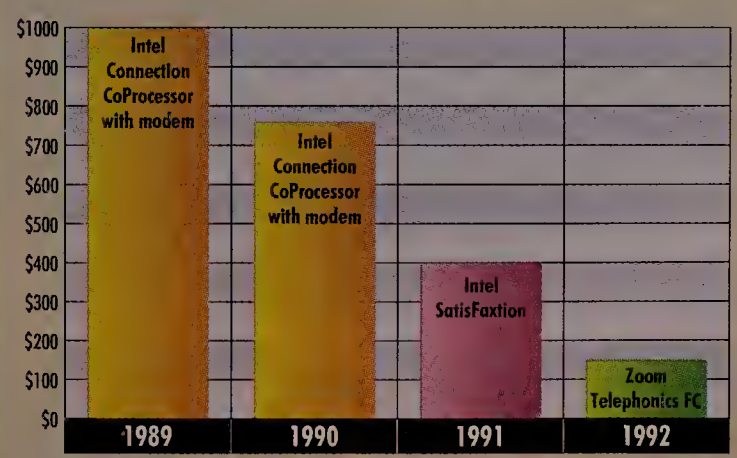
Los Angeles	Miami/ Ft. Lauderdale	New York	San Francisco Bay Area	Washington, D.C.
$1364	$1248	$1349	$1399	$1367
$1899	$1701	$1403	$1542	$1620
$1250	$1250	$1250	$1250	$1250
$1899	$1831	$1767	$1610	$1706
$2284	$2333	$2341	$2347	$2353
$1644	$1632	$1603	$1554	$1517
$2928	$2991	$3052	$3150	$3074
$3138	$2954	$2752	$2757	$2834
$1630	$1630	$1630	$1630	$1630
$2541	$2456	$2403	$2354	$2278
$1845	$1845	$1845	$1845	$1845
$4471	$4197	$3898	$3740	$3940
$2890	$2778	$2856	$2894	$2907
$2785	$2596	$2780	$2883	$2918
$3833	$3444	$3009	$3182	$3155
$5214	$5107	$4691	$5059	$4870
$3665	$3418	$3715	$3716	$3808
$5539	$5195	$4473	$4824	$4687
$10,204	$9737	$8741	$9855	$8932
$5046	$4751	$4640	$4785	$4484
$2030	$1974	$1854	$2084	$2050
$2779	$2661	$2660	$2833	$2847
$1501	$1527	$1541	$1433	$1627
$3059	$2896	$2988	$2922	$2941
$1799	$1799	$1799	$1799	$1799
$2685	$2700	$2566	$2428	$2536
$3056	$2984	$2896	$2895	$2941
$968	$997	$922	$979	$987
$2188	$2198	$1883	$2077	$2150
$2527	$2788	$2427	$2618	$2607

PC Futures: Costs Drop Another Notch

AST and Dell score again on the Bargains of the Month,[1] with AST's Premium II 486/33 taking desktop honors and Dell's System NX20 leading among portables. SX-based machines continue to dominate the best-seller list, while their costs continue to drop. Even IBM's getting into the act: At press time the list price on the PS/2 Model 35 SX slid to $1310, which will translate to a street price around $1000. Higher-end machines also are seeing hefty cuts: Compaq's Deskpro 486/33M dropped from $6022 to $4902. The small, direct-sale PC vendors that don't appear in IDC's surveys offer complete 486/33 models for well under $3000. On the CPU front, prices will be further hammered this spring as Chips and Technologies and Cyrix join the ranks of vendors shipping 386-compatible chips. On the peripheral front, fax-modems offer a textbook example of how prices are cut when cheap new silicon components arrive.

Fax-Modem Street Prices Plummet

First-quarter pricing for selected fax-modem boards with coprocessor



Costs of fax-modem boards have dropped so dramatically that today you almost get the fax capability for free. The products here feature an on-board processor; for well under $100, you can now buy other fax-modem boards that employ the PC's CPU to handle the processing.

[1] Bargains of the Month are determined by adjusting prices on PCs of a given class for standard memory and storage, then finding which PC compares best.

Source: Mail-order and dealer advertisements

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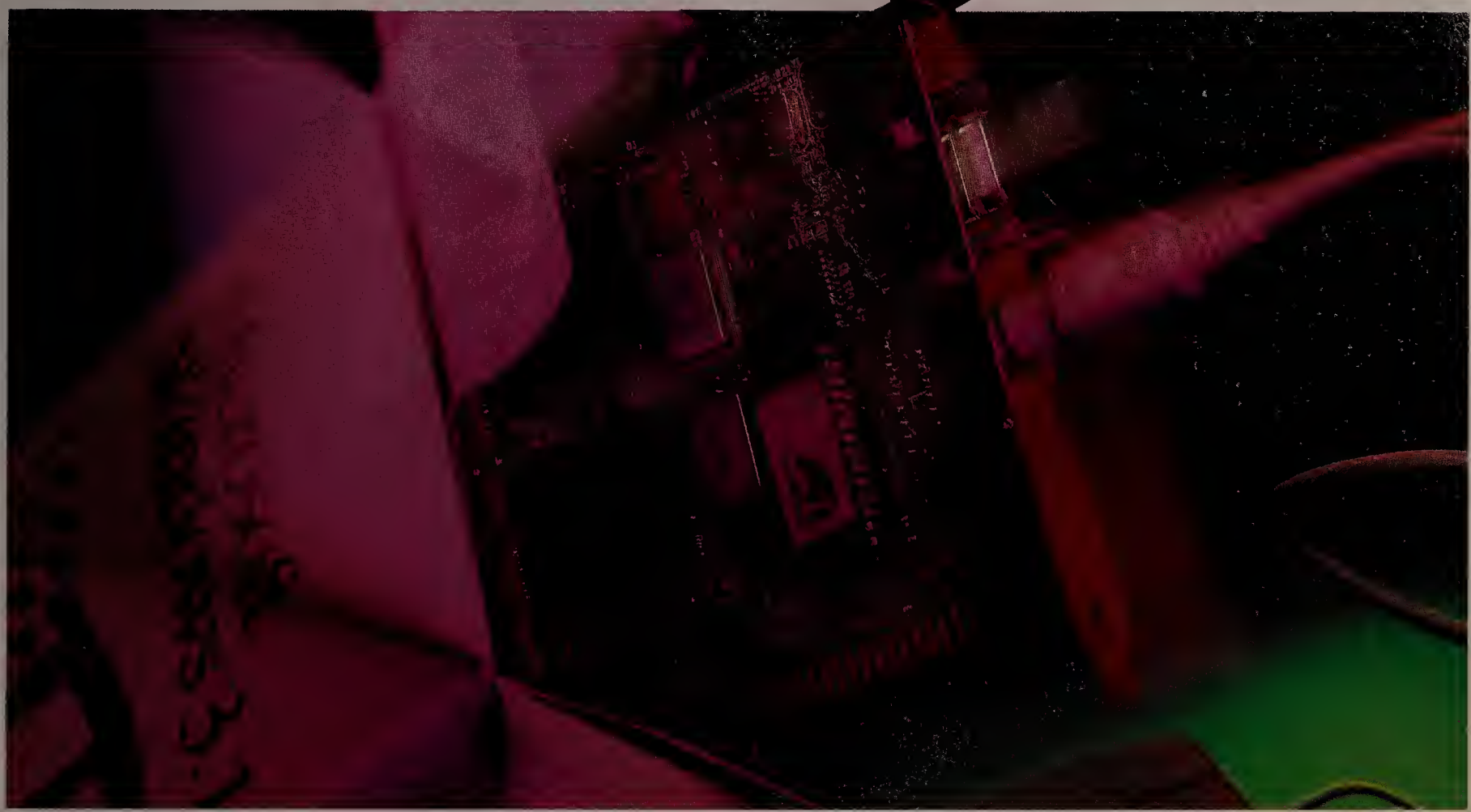
Screen Graphics created with Photo-Finish™, courtesy of ZSoft Corporation

Circle 255 on reader service card

Are You Ready for Windows 3.1?



Millions of copies later, Windows has changed the face of computing. Today, ATI welcomes Windows 3.1, a more reliable, usable, and robust graphical user interface.

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33-MHz 486s:

HOT Commodities

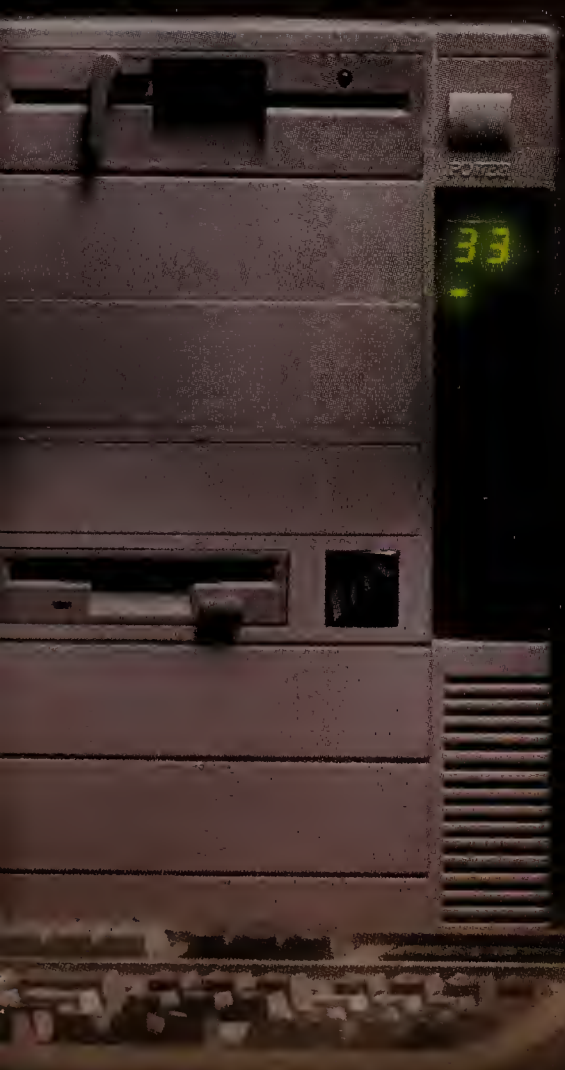
Thanks to warehouse pricing, smart buyers are skipping 486SXs and heading straight for the real thing. Find out which of these 33-MHz 486DXs has your name on it.

PC buying patterns are hard to predict, and over the last year vendors have presented a confusion of choices in the upper-middle range of the systems market: Should you get a 33-MHz 386 or a 20-MHz 486SX? A 40-MHz 386 or a 25-MHz 486SX? Do you really need a processor-card upgrade option, or should you just buy a 486 and take your chances with Intel's new OverDrive clock doubler? And when the chips are down, do you care whether your CPU comes from Advanced Micro Devices (AMD) or Intel?

Customer response to this wealth of possibilities surprised some manufacturers: While many a 486SX languished on the shelf, a lot of buyers went straight to the top and bought systems based on the powerful 33-MHz 486DX. And why not? For only a few hundred

BY MARK BROWNSTEIN AND ANDREW REESE

PHOTOGRAPHS BY ROBERT CARDIN



dollars more than a 25-MHz 486DX, they could get tried-and-true performance and a working math coprocessor, and leave the question marks behind.

Thanks to the arrival of 50-MHz 486 systems (and the battles between Intel and AMD), prices on 486/33s have plunged so low that the 25-MHz 486DX has been squeezed out of the market, and many users are bypassing the coprocessorless 25-MHz 486SX. We've rounded up 25 blistering 33-MHz 486s that are ready for desktop use at an average street price of $3400. If this price sounds good, consider that more than a third of these PCs can be had for under $3000, and two sell for under $2500.

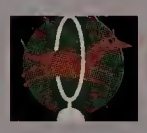
The 486DX Edge

If you've been seeing dirt-cheap prices available on 33-MHz 386s, you may wonder why you should spend the extra $500 to $1000 to buy a 486. The answer is simple: You'll almost double your speed in many applications. Why? The 486 has a built-in 8K memory cache, and it can execute each of the most common processing instructions in a single clock cycle, whereas the 386 requires several.

Perhaps you're still not convinced that a speedier *Windows* or huge DOS spreadsheet is worth the extra premium for a 486/33. Remember, though, that your application load is bound to increase in the future just as it has in the past. As that happens, you'll be ahead of the game with a 33-MHz 486. Probably way ahead: Soon Intel will deliver a double-speed 486DX2 chip that boosts internal processing speed to a scorching 66 MHz. The DX2 will be built into many members of the next generation of 486 systems and may also be available from your system vendor, in which case you can do your own upgrade. Up-

Buying Smart: Full-Speed, Affordable Desktops

Just a year or so ago, only dreamers or lottery winners would envision a 33-MHz 486 on their desktop. With street prices hovering around $10,000, 486/33s were affordable only as servers. But after many deep price cuts, the average street price of the 486/33s in this roundup is a budget-conscious $3400. These PCs handle today's demanding graphical applications and multitasking with ease, and their extra edge of power places you in a great position for the next wave of applications.



PERFORMANCE

Even the slowest machine in our roundup ran our test suite over 22 percent faster overall than the Swan 486SX/25, the quickest 25-MHz 486SX in our March roundup. On average, these 486DX/33s were over 56 percent faster than the 25-MHz PCs.

Processor speed may be a given, but in this fast company, you'll find significant differences among machines depending on system design and performance of peripherals. For example, a system with a 16-bit memory bus—as used in Positive's PC2000/C433—will be slower than one with a 32-bit bus when working with a memory-intensive application like *1-2-3*. Most vendors supplied a standard IDE interface with a fast IDE hard disk for this review, but two included SCSI drives. If you use a program like *dBASE*, consider ordering a caching controller and possibly a SCSI or ESDI hard disk.

You can also boost your performance with a faster video adapter. In ordering products for testing, we asked for standard VGA displays and adapters, but some systems ship with faster video cards that include on-board graphics coprocessors, usually resulting in faster *Windows* scores. If you do desktop publishing or presentations or use *Windows* in 1024 by 768 mode, a faster card is worthwhile; you can always buy a third-party board if the vendor doesn't bundle one.

Based on our weighting system, which reflects common application use and places the most emphasis on *1-2-3* benchmarks and the least on the data base tests, the Touche 486/33 Model 5550T had the fastest overall times.

PRICE

Lately readers have been telling us that price is just as important to them as performance, and our ratings of these systems reflect that finding. Our cost comparisons are based on the street price of units set up in the same standard configuration: 4MB RAM, a 200MB to 240MB hard disk, a single floppy drive, VGA and color display, one parallel and two serial ports (or one parallel, one serial, and one mouse port), a keyboard, a mouse, and DOS 5.0. We note any exceptions. For every system we price (except those that are sold direct), we call at least three PC dealers in each of eight major cities across the country to get quotes. We then average the results for each system.

An increasing number of vendors bundle mainstream business applications with their systems. In calculating our price ratings, we subtract from a system's street price an amount equivalent to 25 percent of the list price of any bundled software. We do the same for hardware that exceeds our standard configuration. When making this adjustment, we consider items such as extra floppy drives and extra RAM and exclude enhancements such as graphics accelerators and caching controllers. The least expensive system in our roundup is Insight's price-busting 486-33 ISA Cache.

grading your CPU probably won't be as easy or as cheap, however, as with a 486SX (see the sidebar "Intel's OverDrive Upgrade to 66 MHz").

But these 33s are plenty fast just as they are. The Touche 486/33 Model 5550T showed the best overall times, but 10 of the 25 systems deliver four-star performance. That includes our Best Buy—the USA Flex 486 33-MHz Cache System—which also delivers superb support and ample room to expand, all for just $2634 direct from the vendor.

PC buyers have spoken: They want the fastest proven technology they can put on their desks for a reasonable price. Come to think of it, maybe that's not so unpredictable after all.

At press time many vendors told us of further price cuts, so check around before you order. In fact, we changed our Features Evaluation to allow for the volatility of pricing in this market. We still give you a street and list price as of the date we acquire review systems. Now, however, we include list prices gathered shortly before we go to press. Street pricing is too time consuming to redo, but this way you get a fresher look at the market. —Ed.

Mark Brownstein is the Los Angeles bureau chief for InfoWorld, *and Andrew Reese is a technical writer for a major software publisher in the San Francisco Bay Area. Rex Farrance and Melissa Riofrio are assistant editors for* PC World; *they can be reached on PC World Online (see page 8 for more information). Anita Hamilton, an editorial assistant for* PC World, *contributed research to this article.*

For more information about all products in this article, circle reader service no. 904.

EXPANDABILITY

The 486/33 is already near the crest of the PC processing curve—only the 50-MHz 486 and the 50-MHz 486DX2 are faster—so the ability to upgrade to a faster CPU is not as critical as with lower-powered machines. Still, a processor-card design opens up a path to 50 MHz and beyond.

With any PC, you need enough expansion slots and drive bays to hold your peripherals. If you plan to link your computer to a network, you'll probably have access to the server, so you should be able to get by with three bays—one internal and two externally accessible—and four free expansion slots. But for a stand-alone PC and especially for a server, you'll want at least four bays and five slots.

Neither the Micro Channel bus nor the EISA bus has taken the world by storm, but these 32-bit buses can deliver speed advantages if you plan to use a high-performance network board or drive controller on the server of a large, busy network. Further, these machines protect your future 32-bit upgrade options. For most desktop peripherals, however, industry standard 8/16-bit slots are fine, and ISA systems will save you $500 to $1000 or more. The Everex Tempo M 486/33, Northgate Elegance ZXP, and Zeos 486DX-33 ran a dead heat for top overall expandability.

With the exception of the Positive PC2000/C433, all these 486s can accommodate at least 32MB of fast RAM, which runs at the same speed as the CPU. So with most of these machines, you don't have to worry about your ability to handle future RAM-hungry applications. You'd need OS/2 2.0, the coming *Windows NT*, UNIX, or NetWare 386 and a big, busy network to take advantage of anything over 16MB. The Reply Model 32 486/33 explores the outer limits of RAM expandability with its lofty 128MB.

SERVICE AND SUPPORT

All these systems come with at least a one-year warranty and a technical support number you can call when you need help. Don't consider a machine from a vendor that offers less. Unless your company has its own service department, low-cost or free on-site service is a comfort. We test technical support by calling central support, asking three questions of varying difficulty, and rating the responses according to promptness, courtesy, and most important, accuracy. Then we factor in extras like toll-free phone support, fax lines, and so on. We rate dealer support by looking at the vendor's policies on dealer training, inventory, and support staff. Blackship's BLK-486-33MHz (sold direct) earned the best support rating.

DESIGN AND CONSTRUCTION

The most important design consideration is whether your PC will work well in your environment. To make sure your system will support all the usual software and peripherals, we run these systems through tough compatibility tests. The good news: All the systems passed all the tests. We also place a lot of weight on rugged design and ergonomic details. Be sure the keyboard is comfortable and the case sturdy. Getting under the hood and finding your way around shouldn't require a call for on-site assistance, and the power switch, reset button, and floppy drives should all be easily accessible. ALR and AMKLY tied for best overall design.

ALR BusinessVEISA 486/33

★★★ **PROS:** EISA bus, upgradable CPU, excellent design and expandability
CONS: Disk performance a little slow without optional caching EISA controller

The ALR BusinessVEISA 486/33's $3397 street price seems high, but it's $1350 cheaper than any other EISA system here. The ALR is superbly designed and highly expandable, and it paves an affordable path to 32-bit peripherals. Under the hood you'll find four free EISA slots, an 8/16-bit slot, and four drive bays. Better yet, ALR offers a processor-card design and will sell an easy card-swap upgrade to Intel's clock doubler.

The BusinessVEISA tested third slowest overall, still tallying respectable scores on memory-intensive tests like *1-2-3*. When we installed ALR's $895 Ultrastore 4MB caching EISA controller, however, the ALR transformed into a four-star performer, with its *Paradox* test time dropping from 491 to 273 seconds. If you want the capability to handle the future generation of 32-bit cards and disk controllers for high-throughput applications, ALR has the answer.

Want to keep your EISA options open? The upgradable ALR BusinessVEISA 486/33 is your best bet.

The upgradable EISA AMKLY has a removable platform for its power supply and four drive bays.

AMKLY 486/33E

★★★ **PROS:** EISA bus, upgradable CPU, software-upgradable BIOS, excellent design and service **CONS:** Expensive

The AMKLY 486/33E is an EISA CAD workstation in desktop clothing. Its $4764 street price is the second highest here, but capacity for ultra-throughput peripherals comes with it. The case comes off with a twist of thumbscrews, and there's loads of capacity for EISA devices with six free slots. The four drive bays and 200-watt power supply pop out as a unit, making drive changes a snap. Upgrading to a faster processor will be an easy CPU-card swap, and Flash ROM enables BIOS software upgrades.

The AMKLY had solid performance scores using ISA peripherals—it cleared our *1-2-3* hurdle just 4 seconds behind the leader. If you want top speed for *dBASE* or *Paradox*, though, try the optional Ultrastore EISA caching controller. If you need a superbly designed, well-supported EISA PC for a CAD, CAM, or scientific workstation, the AMKLY may be the answer. But its high price will scare off most desktop buyers.

Blackship BLK-486-33MHz

★★½ **PROS:** Very low price, expandable, quality components, fine service and support
CONS: Poor documentation, no easy CPU upgrade

Blackship specializes in direct sale of fast, inexpensive computers, and we've consistently given its desktop systems high marks in recent reviews. There's nothing fancy about the $2655 486-33, but like most systems in this roundup, it's a solid performer. Its seventh-place finish on the *1-2-3* test is just 6 seconds behind the leader. The Blackship may not be your best choice for *AutoCAD*, however—it ran our benchmark almost a third slower than the leading Touche. On the other hand, the Blackship BLK-486-33MHz's roomy tower is eminently expandable with seven free slots, six drive bays, and a 250-watt power supply.

The top-of-the-line support package includes responsive, accurate toll-free tech help. So far, Blackship has no plans to offer a 66-MHz upgrade for this machine. But if you want a real bargain on a solid 33-MHz system with plenty of room to add peripherals, *PC World* says check it out.

A fine value, the Blackship BLK-486-33MHz is notable for its superb service and support.

Compaq Deskpro 486/33M

★★★ **PROS:** EISA bus, upgradable CPU card, modular design
CONS: Most expensive system reviewed

Want to sail into an EISA-compatible future? The Deskpro 486/33M is aimed at big business, and its $6910 street price will take a big bite out of the budget. You see the engineering pedigree in a memory controller that automatically adjusts to new CPU speeds and a modular design with the CPU, EISA bus, RAM, VGA, and I/O on separate cards. In fact, we're reviewing the PC from our March 486SX roundup—with a 33-MHz 486DX CPU card. It has four free EISA slots and four bays inside a thumbscrew-secured case.

With its 210MB Conner hard disk, the Compaq performed well with ISA peripherals. But for top speed on disk-intensive jobs, consider a third-party caching controller. The 486/33M is a fine, easily upgradable PC, but its price is $2100 to $3500 higher than the two other EISA machines. So unless your company is standardized on Compaqs, think twice.

Stunning design, but for this price, you could buy two USA Flex 433s and have $1640 in change.

Need big-time storage? You can mount an amazing nine storage devices inside the CompuAdd's tower.

CompuAdd 433

★★½ **PROS:** The most bays and free slots in the roundup, fast 1-2-3 performance, 300-watt power supply **CONS:** Expensive, case hard to remove

The CompuAdd 433, with its impressive nine bays, is the storage king of our roundup. The CompuAdd gives you seven free slots, but it's hard to get inside the big tower: You have to back out a total of 16 screws before you can remove the sturdy case. This PC is quite quick, with great memory-intensive performance indicated by a finish just 6 seconds behind the *1-2-3* front-runner. For $4010, you also get *Windows,* a collection of demo applications, and a second floppy drive.

CompuAdd service and support rates high, and if you don't mind paying for the extra comfort, you can extend the free year of on-site service to three years for 15 percent of your purchase price. There's no question that the CompuAdd 433 has the speed and expandability you need for a high-powered server. (*At press time, CompuAdd dropped the price on this PC to $2917. —Ed.*)

Compudyne 4DX/33 Cache

★★★ **PROS:** Second-lowest price in the roundup, fast Windows performance
CONS: Poor support responsiveness, no easy CPU-upgrade socket

The Compudyne 4DX/33 Cache is a handsome system with a better-looking $2498 price tag. A solid performer, it did well on the *1-2-3* test and posted a respectable *Windows* score, aided by its *Windows* accelerator. But a sluggish showing on disk-intensive tests indicates you should consider a faster drive and controller if you do much data base work.

Getting inside the case is as easy as backing out a screw and lifting the lid. But technical support is a real problem: We made call after call over a 10-day period, getting nothing but busy signals, long waits on hold, and one unfulfilled promise of a callback. Compudyne is the CompUSA house brand, and you can buy one direct or at your local CompUSA superstore. This local-purchase option, *LotusWorks* free, and a second floppy drive make the system even more attractive. Just don't commit your cash unless you have personnel on staff to answer technical questions.

The bargain-priced 4DX/33 Cache is a good value, but we couldn't get through to tech support.

FEATURES EVALUATION

33-MHz 486 Prices Plummet to Commodity Levels

Late last January, we discovered amazingly low prices on fully loaded versions of the 33-MHz systems reviewed here. Follow-up calls at press time yielded even lower prices—sometimes thousands lower!

● Yes
○ No
n/a = not applicable

	ALR BusinessVEISA 486/33	AMKLY 486/33E	Blackship BLK-486-33MHz	Compaq Deskpro 486/33M	CompuAdd 433	Computyne 4DX/33 Cache	Dell System 486P/33	Eltech 4330	Everex Tempo M 486/33	FastMicro FastData 486/33
Standard features										
1/92 street price[1]	$3397[3]	$4764	$2655	$6910	$4010	$2498	$2968	$2528[4]	$4395	$2518[4]
1/92 list price[1]	$4244[3]	$6035	$2655	$8196	$4010	$2498	$2968	$2528[4]	$5663	$2518[4]
3/92 list price[1,2]	$4244[3]	$5370	$2595	$6245	$2917	$2299	$2698	$2499[4]	$4513	$2249[4]
External memory cache (K)	0	0	64	0	64	128	0	0	128	128
Bus	EISA	EISA	ISA	EISA	ISA	ISA	ISA	ISA	ISA	ISA
Direct/discount/dealer sales	○/●/●	○/○/●	●/○/○	○/○/●	●/○/○	●/●/○	●/●/●	●/○/●	○/●/●	●/○/○
Windows included	○	○	●	○	●	●	●	●	●	●
Bundled apps (approximate street price)	○	○	○	○	○	○	○	$129	○	○
Hard disk type/size (MB)	IDE/200	IDE/210	IDE/210	IDE/210	IDE/210	IDE/210	IDE/230	IDE/210	IDE/210	SCSI/210
Hard disk manufacturer/model	Maxtor IDE LXT 213A	Conner CPT3204F	Conner CPT3204F	Conner CPT3201F	WD Piranha 4200	Seagate 1239A	Quantum LPS240AT	Conner CP3204F	Maxtor LXT 213A	WD Piranha 4200
Expandability										
Free 8-bit/16-bit/32-bit slots	0/1/4 EISA	0/0/6 EISA	0/7/0	0/0/4 EISA	0/7/0	2/4[9]/0	0/3/0	1[10]/4/0	1/6/0	1/4/0
Externally accessible/internal drive bays	3/1	2/2	4/2	3/1	4/5	3/1	2/1	5/0	5/0	6/0
Largest hard disk option	1.2GB	1GB	1.2GB	510MB	630MB	1.2GB	500MB	1.2GB	1GB	1.2GB
Fast-RAM capacity (MB)	49	64	64	64	64	64	64	64	32	32
Board or CPU/clock upgrade	●	●	○	●	○	○	●	○	●	○
Design and construction										
Setup utility in ROM	●	●	●	●	●	●	●	●	●	●
Compact footprint	●	○	n/a[13]	○	n/a[13]	○	●	○	○	n/a[13]
Front panel on/off switch	●	●	●	●	●	●	●	○	○	●
Parallel/serial/mouse ports	1/1/1	1/2/1	1/2/0	1/2/1	1/2/0	1/2/1	1/2/1	1/2/0	1/2/0	1/2/0
Service and support										
Warranty (months)	12	12	12	12	12	12	12	12	12	12
On-site service /under $100 per year	●/●	●/●	●/●	○/○	●/●	●/●	●/●	●/●	●/●	●/●
Turnaround policy	72 hours	24 hours	48 hours	○	72 hours	72 hours	24 hours	48 hours	72 hours	48 hours
Free unlimited support	●	●	●	●	●	●	●	●	●	●
Vendor support										
Central support/toll free	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/○	●/●
Daily support (hours)	11	24[17]	12	12	11	12[17]	15	9	12	9
Weekend support	●	●	○	○	○	○	●	●	○	●
Electronic BBS/fax	●/●	●/●	○/●	○/○	●/●	●/●	●/●	○/●	●/●	○/●
Vendor-to-dealer support										
Dedicated support staff required	○	no dealers	no dealers	○	●	●	no dealers	○	○	no dealers
Support staff training required	○	no dealers	no dealers	○	●	●	no dealers	○	○	no dealers
Dedicated support line for dealers	●	no dealers	no dealers	●	●	●	no dealers	○	●	no dealers
Inventory and parts requirement	○	no dealers	no dealers	●	●	●	no dealers	○	○	no dealers

[1] Except as noted, price is based an 4MB RAM, 200MB to 240MB hard drive, 1.2MB or 1.44MB floppy drive, VGA and color VGA monitor, at least one parallel and two serial (or one parallel, one serial, and one mouse) ports, keyboard, mouse, and DOS 5.0. We include a fair estimated cost for components not provided.
[2] 3/92 street prices unavailable at press time.
[3] Includes 5MB RAM.
[4] Includes 1MB caching IDE controller.
[5] Includes 8MB RAM.
[6] Price determined by dealer.
[7] With Maxtor 207MB hard drive.
[8] Includes AmiPro 2.0, 1-2-3 for Windows,

Gateway 2000 33MHz 486DX	Insight 486-33 ISA Cache	Kris System 48C-3	Leading Edge D4/33	Micro Express ME 486-33	Northgate Elegance ZXP	Packard Bell Force 486/33+	Positive PC2000/C433	Reply Model 32 486/33	Swan 486/33 Power System	Tangent M433i	Touche 486/33 Model 5550T	USA Flex 486 33-MHz Cache System	Wyse Decision 486/33	Zeos 486DX-33
$2945[5]	$2494	$3106	$3025	$3005	$3549	$3059	$2999[5]	$4402	$3395[5]	$3190	$3274[4,5]	$2634	$4583	$3245[5]
$2945[5]	$2494	$3205	$4219	$3005	$3549	6	$2999[5]	$7100	$3395[5]	$3190	$3274[4,5]	$2634	$5399	$3245[5]
$2795[5]	$2299	$2750	$3318	$2835	$3149	$2995	$2799[5]	$7100	$3295[5]	$3190	$2948[4,7]	$2634	$5356	$3245[5]
64	64	256	64	256	64	0	0	0	64	64	64	128	128	0
ISA	ISA	ISA	ISA	ISA	ISA	ISA	ISA	MCA	ISA	ISA	ISA	ISA	ISA	ISA
●/○/○	●/○/○	○/○/●	○/●/●	●/○/○	●/○/●	○/○/●	○/●/○	●/○/●	●/○/○	●/○/○	●/○/○	●/●/●	○/○/●	●/○/○
●	○	○	●	●	●	●	●	○	●	●	○	●	○	●
$300	○	○	$129	○	○	$120	$129	○	$129	○	○	$129	○	$900[8]
IDE/200	IDE/240	IDE/210	IDE/240	IDE/200	IDE/240	IDE/210	IDE/200	SCSI/240	IDE/240	IDE/210	IDE/240	IDE/210	IDE/210	IDE/210
WD Piranha 4200	Quantum ProDrive 240	Conner CP3204E	Quantum QM24A012	Quantum ProDrive 240	Quantum ProDrive LPS	Seagate 1239	Conner CP3204F	Quantum ProDrive 240	Conner C2235	WD Piranha 4200	Quantum ProDrive 240	WD Piranha 4200	Maxtor LXT213A	WD Piranha 4200
0/6/0	1/5/0	1/5/0	0/6/0	0/6[9]/0	1/5/0	0/4/0	0/4/0	0/0/4 MCA	2/4/0	0/5/0	0/6/0	0/6/0	2/4/0	1/6/0
3/2	4/4	4/4	3/1	4/4	3/4	3/1	3/1	3/2	5/1	3/2	4/4	4/1	3/1	4/4
1.2GB	1.4GB	1.2GB	400MB	1.2GB	1.2GB	210MB	400MB	1GB	1.6GB	2.1GB	2.4GB	1GB	600MB	1.1GB
64	64	32	32	32	32	32	16[11]	128	32	64	32	32	32	32
○	○	○	●[12]	○	●	○	●	●	○	○	○	●	○	●
●	●	●	●	●	●	●	●	○	●	●	●	●	●	●
○	n/o[13]	n/o[13]	●	n/o[13]	n/o[13]	●	○	●	○	●[14]	n/o[13]	●[14]	○	n/o[13]
○	●	●	●	○	●	●	●	●	●	●	●	●	○	●
1/2/0	1/2/0	1/2/0	1/2/0	1/2/0	1/2/0	1/2/1	1/2/0	2/2/1	1/2/0	1/2/0	1/2/0	1/2/0	1/2/0	1/2/0
12	12	24	20	24	12	12	12	12	24	12	24	12[15]	12	12
●/●	○/○	●/●	●/●	●/●	●/●	●/●	●/○	●/●	●/●	●/●	●/●	●/●	●/●	●/●
48 hours	48 hours	48 hours	none	48 hours	5–7 days	○	○	72 hours	72 hours	24–72 hours	24 hours	●	72 hours	24 hours[16]
●	●	●	○	●	●	●	●	●	●	●	●	●	●	●
●/●	●/●	●/●	●/○	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
18	14	10	11	24	24	16	12	12	12	10	8	24[17]	8	24
●	●	○	○	●	●	●	●	○	●	●/●	○	●	○	●
●/●	○/●	○/●	●/●	○/●	●/●	●/●	○/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
no dealers	no dealers	○	○	no dealers	no dealers	○	○	○	no dealers	no dealers	no dealers	no dealers	●	no dealers
no dealers	no dealers	○	○[18]	no dealers	no dealers	○	○	○	no dealers	no dealers	no dealers	no dealers	●	no dealers
no dealers	no dealers	○	●	no dealers	no dealers	●	●	○	no dealers	no dealers	no dealers	no dealers	●	no dealers
no dealers	no dealers	○	○	no dealers	no dealers	○	○	○	no dealers	no dealers	no dealers	no dealers	●	no dealers
												BEST BUY		

and WinRIX 1.0. Estimated street value $700 for Lotus products, $200 for WinRIX.

[9] Dedicated memory slot doubles as 16-bit slot.

[10] Dedicated memory slot doubles as 8-bit slot.

[11] 16MB fast RAM; 16MB EMS.

[12] Removable system clocks available from 20 to 33 MHz.

[13] Tower model.

[14] Minitower model.

[15] Lifetime warranty on labor.

[16] Policy is one-day turnaround for on-site service, a $49 option.

[17] Support staff answers phones during business hours, otherwise paged.

[18] Support available through VARs only—direct to end users.

Dell System 486P/33

★★ ★½ **PROS:** Very compact, highly integrated, quality service package
CONS: Short slot and bay count

The dainty $2968 System 486P/33 seems like a natural network workstation. Dell integrated the VGA, I/O functions, and IDE connector onto the tiny motherboard. In the small chassis, you get just three free slots and three bays. If you need both standard floppy formats, you can mitigate the bay shortage by ordering a dual drive to fill the one 5¼-inch bay.

Overall performance was good, running within seconds of the leaders on all but the most disk-intensive tasks, such as *dBASE*. If you want an even faster processor, however, Dell will sell you a 486P with a 50-MHz DX2 for just $100 more. Dell support is legendary and includes an outstanding 24-hour on-site service turnaround policy. If you have a mission-critical application, Dell's optional package offers 4-hour response from Novell-certified technicians. If you want small size and super support more than expandability, the System 486P/33 should fit in nicely.

The Dell 486P/33 is unobtrusive on the desktop and fast on the uptake. Naturally, it's well supported.

We got a 1MB caching controller with this Eltech and astounding Paradox scores.

Eltech 4330

★★ ★½ **PROS:** Great price, top Paradox performance, fine service and support
CONS: Relatively slow dBASE performance, no easy CPU-upgrade socket

Eltech systems have won three Best Buys since last October—a testimonial to the company's reliability. This time it's close, but no cigar, due to the stiff competition. Still, the Eltech 4330 we tested came in second in overall value and is a whale of a deal. The $2528 price included an optional $329 Promise Technology DriveCache 2030 caching controller with 1MB of RAM. With it (and a 210MB Conner IDE hard drive), the Eltech blew away its nearest competitor—nearly two-to-one on the *Paradox* test. The 4330's overall speed was excellent, but *dBASE* results were slow.

Eltech's quick, friendly toll-free support is good, and you get six months' free on-site service, extendable to a year for a reasonable $69. *Windows, PFS WindowWorks, McAfee Viruscan,* and a DOS and *Windows* training package are all free. This is a fine, affordable system, and with the caching controller, it's a great *Paradox* machine.

Everex Tempo M 486/33

★★ ★ **PROS:** Fast 1-2-3, Windows, and dBASE performance, lots of slots, upgradable CPU, speaker switch **CONS:** Very expensive, support line not toll free

Want a 486/33 capable of an overnight transformation to 50 MHz or higher? Check out the Everex Tempo M 486/33—its backplane motherboard lets you swap out the 486/33 for a faster processor module. Even at 33 MHz, this PC is no slouch. Its 128K write-back cache helped it to a virtual tie for first on *1-2-3* and *Windows* and a finish just 23 seconds behind the *dBASE* leader. This full-size desktop features five front-accessible drive bays. It also gives you integrated ports, floppy controller, IDE connector, and VGA, leaving you seven free slots. You also get Everex's trademark LED diagnostics and *Windows*.

Everex's service and support is dependable, but the support line is not toll-free. Although its high $4395 price may make this a purchase that's hard to justify, the Tempo is a good value—a fast, easily upgradable PC packed with sophisticated engineering.

The Tempo M has a backplane motherboard that lets you swap in a faster 486 processor module.

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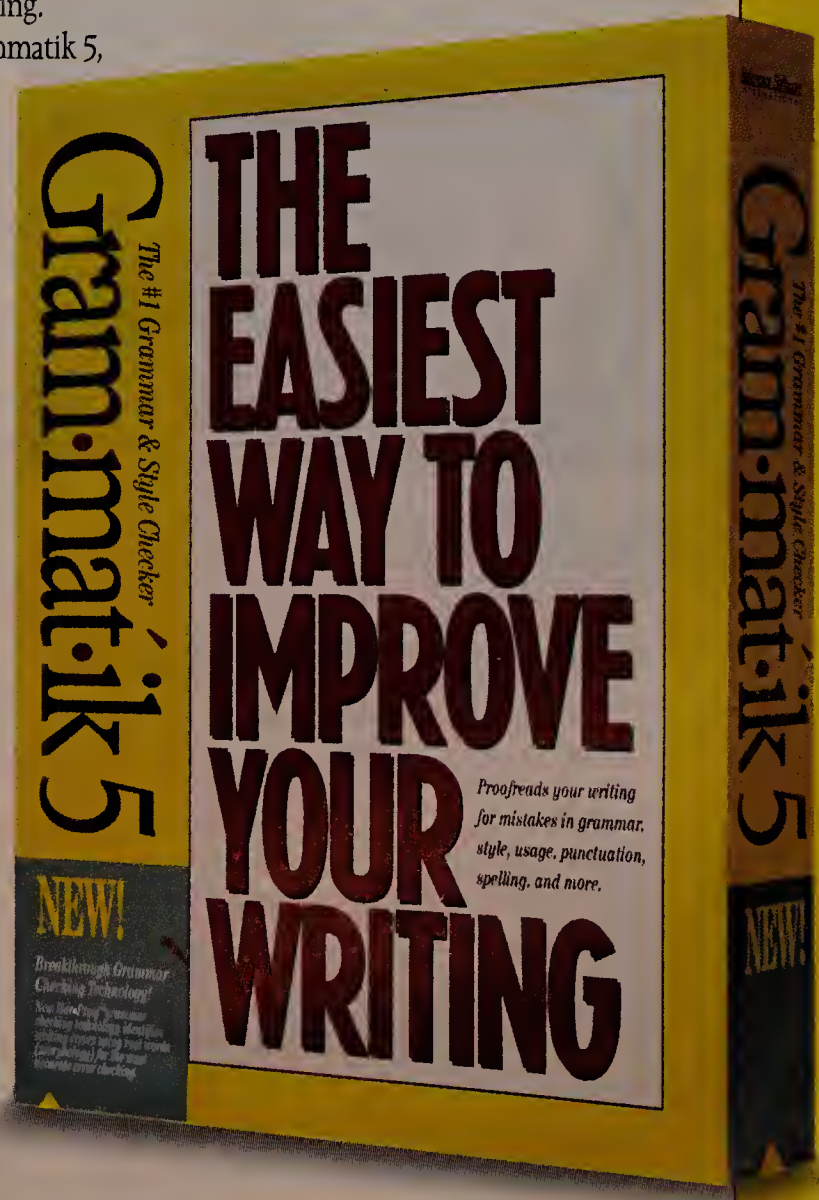

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Circle 282 on reader service card

FastMicro FastData 486/33

★★ ★½ **PROS:** Fast, excellent price, two floppy drives standard, 16-bit VGA with graphics accelerator **CONS:** No easy CPU-upgrade socket

FastMicro has quite a direct-sales following, and you can bet that the bargain-priced FastData 486/33 will find plenty of takers. The $2518 system got high marks on *1-2-3* and tied for first on *Windows*, no doubt helped by its Diamond VRAM Stealth high-performance VGA card. And its DPT Cache Controller (with 1MB of RAM) and 210MB Western Digital hard disk reaped a payoff on the disk-intensive *dBASE* test. This nicely expandable tower includes two floppy drives, a 250-watt power supply, five free slots, six front-accessible drive bays, and *Windows*.

FastMicro phone support is good. You get a 30-day money-back guarantee, but the on-site service is conditional: If you have a failure, the company will send parts overnight and talk you through a repair attempt. If it doesn't work, FastMicro sends out a technician or a new system. If this approach works for you, this PC has a lot of bang for the buck.

A graphics accelerator and caching disk controller helped the FastData live up to its name.

The Gateway offers blazing speed, a fine price, great service, and free business software.

Gateway 2000 33MHz 486DX

★★ ★½ **PROS:** Fast, 8MB RAM, two floppy drives, graphics accelerator, fine service **CONS:** No easy CPU-upgrade socket

Gateway 2000 has grown from a direct-mail upstart to an institution for the value conscious, picking up our Service Excellence Award along the way. This full-size PC has a striking curved front panel and a white case. It's fast, too, finishing in a virtual tie for top performance overall, third on *dBASE*, and second on *Paradox*. Thanks to its ATI Graphics Ultra accelerator, it also tied for first on *Windows*. Despite its low $2945 price, you get 8MB RAM, six slots free, five drive bays, a 200MB hard disk, two floppy drives, and a 124-key programmable keyboard.

To close the deal, Gateway gives you DOS 5.0, *Windows*, and either *Excel*, *Word for Windows*, *PowerPoint*, *Paradox*, *Project for Windows*, *Windows Programmer Pack*, or an *Entrepreneur Pack* software library. Add up all the Gateway 486DX has to offer, and you have the equation for one of the best deals happening in the market.

Insight 486-33 ISA Cache

★★ ★½ **PROS:** Best price in roundup, fast, lots of slots and bays **CONS:** Poor documentation, no easy CPU-upgrade socket

Insight built a strong reputation as a vendor of hard drives but is becoming better known for direct sales of fine systems at great prices. The 486-33 ISA Cache's street price is an eye-popping $2494. You can buy the system for 486SX money, but it performed like a thoroughbred, finishing 6 seconds behind the leader on our memory-intensive *1-2-3* test, and its Quantum ProDrive 240 IDE drive helped it to an excellent time on the disk-intensive *dBASE IV* benchmark.

This standard tower offers a spacious interior with six free slots and eight drive bays and a 250-watt power supply. Insight also gives you a front-mounted digital speed display, on/off, reset, and turbo switches. On the downside, the documentation is a bit thin. Still, if you want top 33-MHz performance at your desk or in the server room—at the cheapest price around—the Insight is a smart choice.

Priced at a miserly $2494, the Insight 486-33 ISA Cache still gives you four-star performance.

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"Best Value," February 1992

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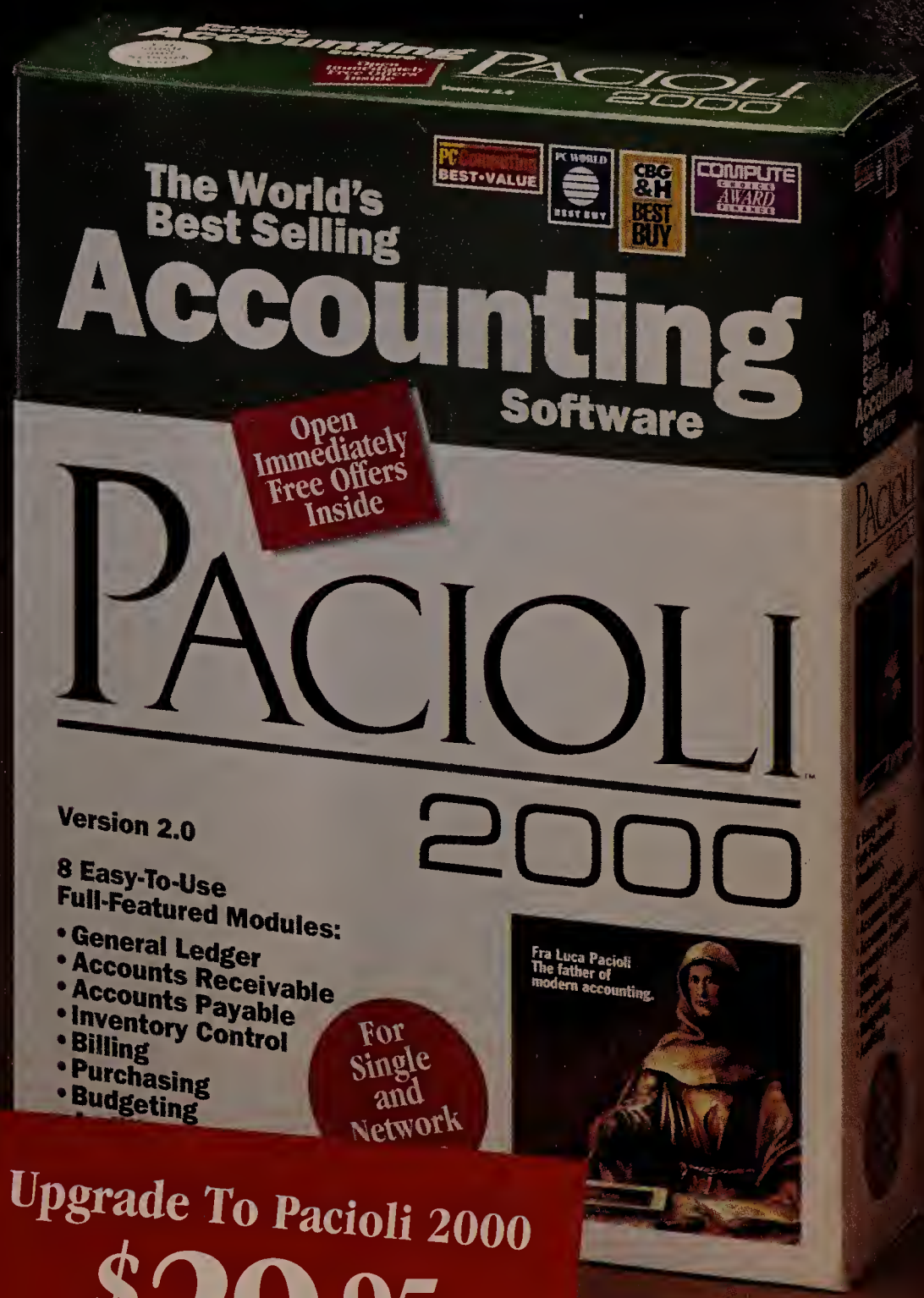

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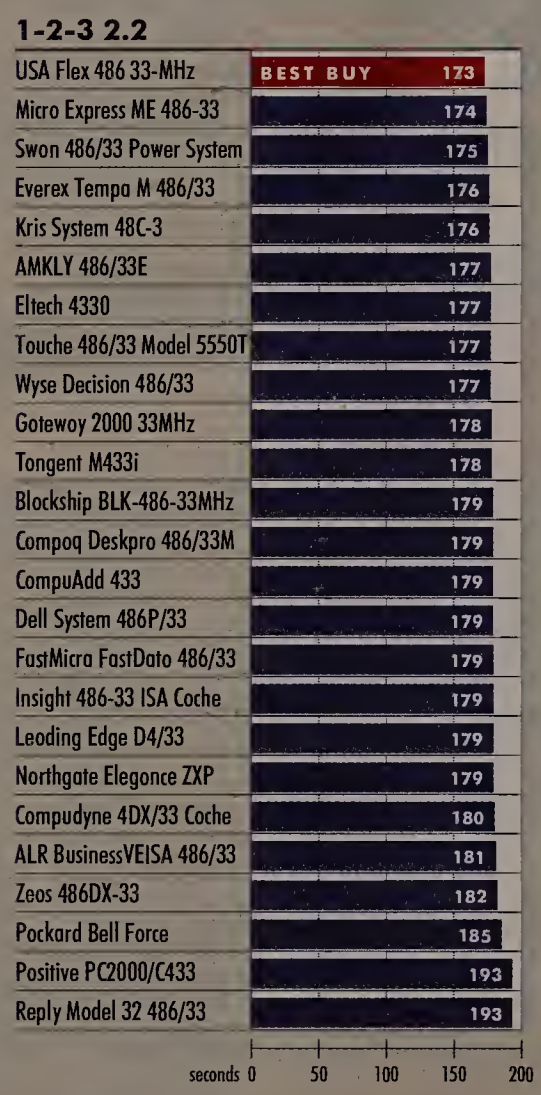
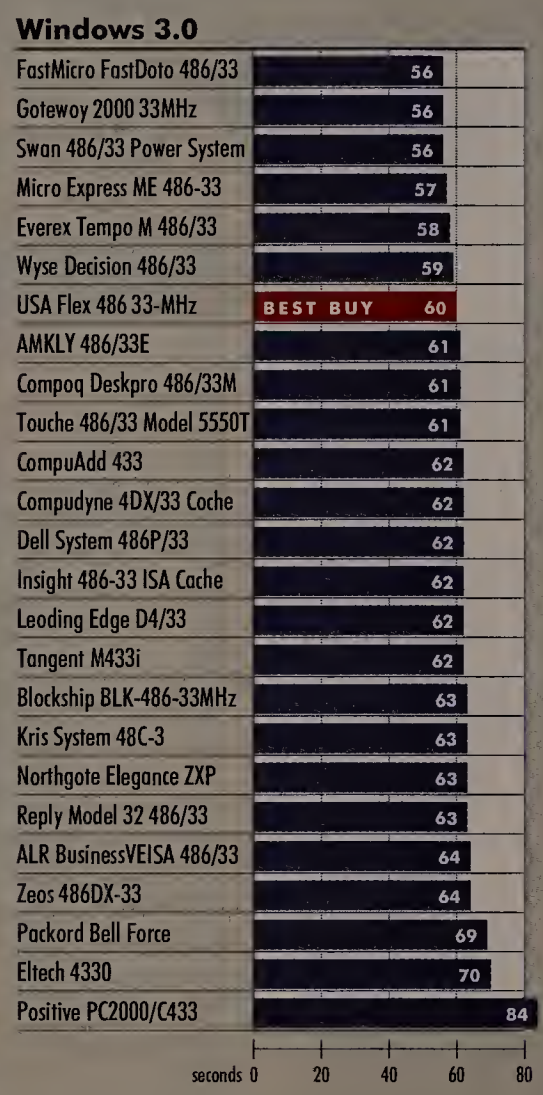
PCWP2

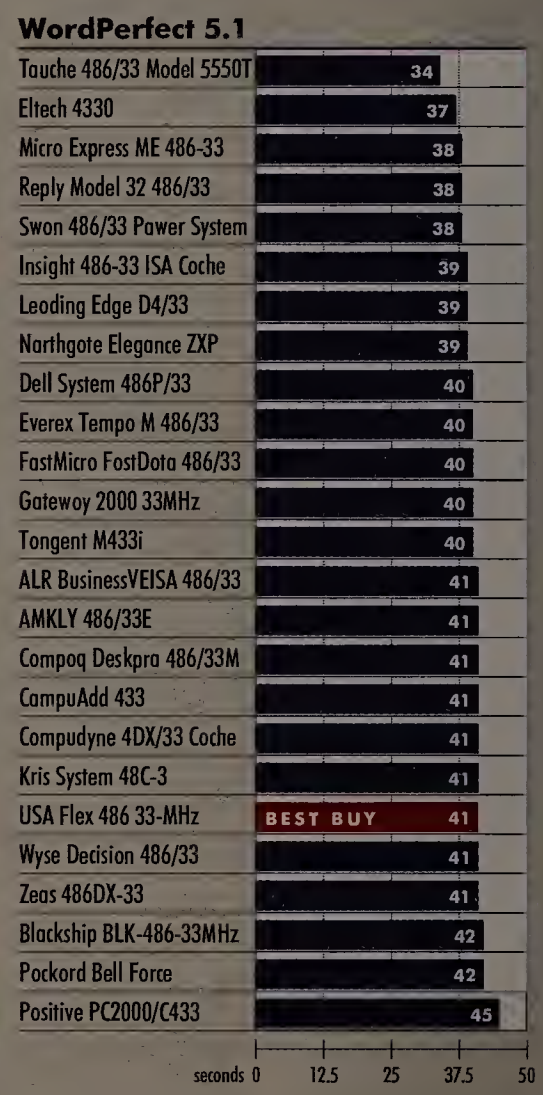
PC WORLD TEST REPORT

486/33s: The Inside Track to the Fastest Desktop PC

Useful working speed is what a 486/33 is all about. Touche, Micro Express, Swan, and Gateway finished in a virtual dead heat in our application benchmarks, and Eltech's caching controller made short work of Paradox.







Methodology
We tested all the computers with 4MB RAM. The systems' hard disks were 200MB to 244MB. We used the vendor's version of DOS 5.0 or MS-DOS 5.0.

1-2-3 2.2
We load the application, followed by three separate worksheets (arithmetic, financial, and scientific). We make various changes and run recalcs on each. Finally, we use the *MAPS* add-in from Management Advisory Services of Seattle to run a number of financial forecasts.

Windows 3.0
Timing begins and ends at the DOS prompt. We launch *Windows* along with a macro that loads *Microsoft Excel* with a financial worksheet and initiates a recalc. Then the macro loads Lotus's *Ami Pro* along with a 50K document that contains a 500K TIFF image. Finally, the macro launches *Micrografx Designer*, opens a drawing, displays it on screen, and exits to DOS.

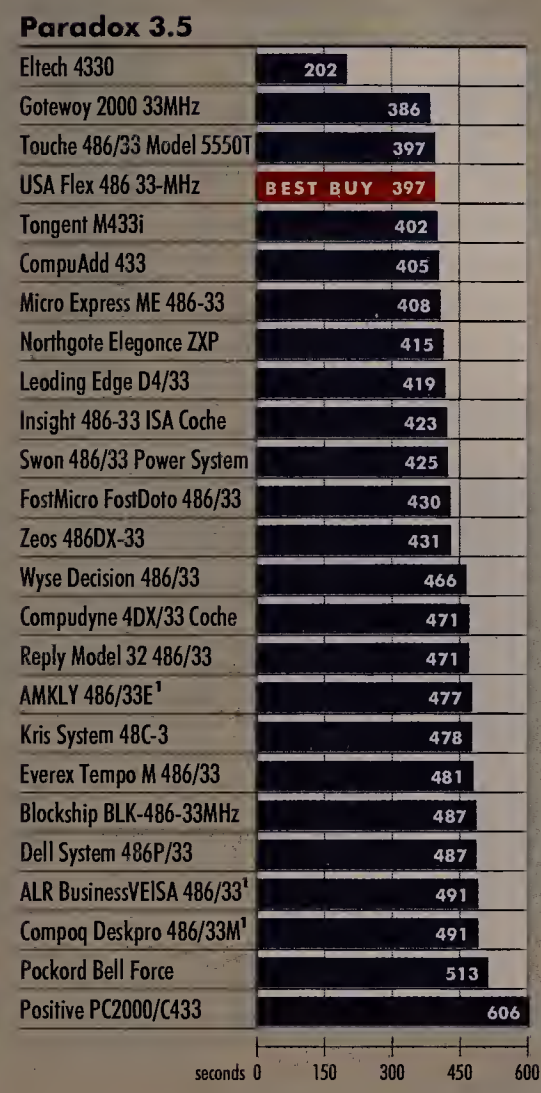
PC Buyers Join the Club

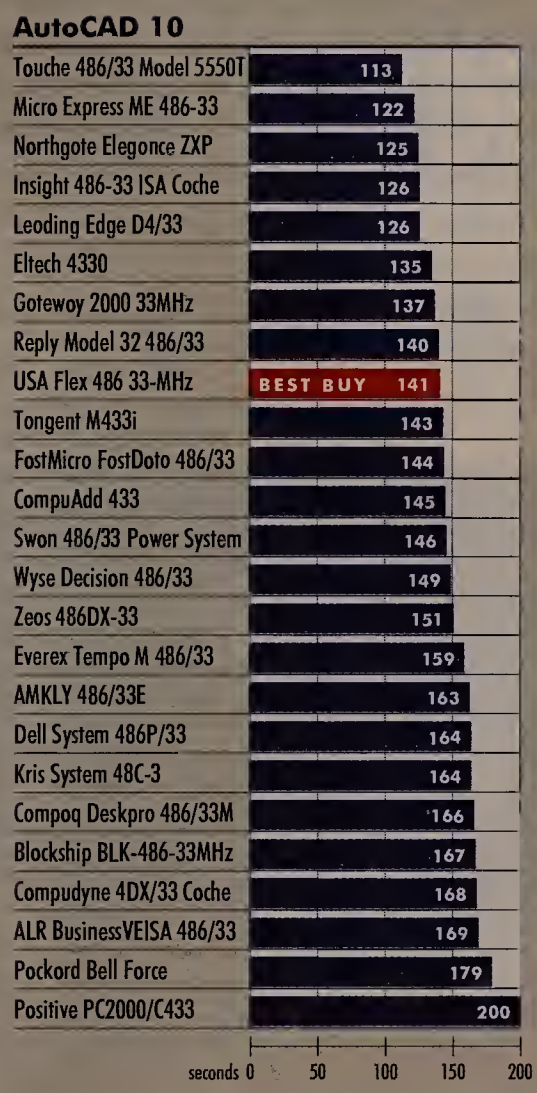
by Melissa Riofrio

You don't have to buy mail order or from a computer superstore to get a great deal on a PC. Join a membership-only warehouse club—like Costco, Pace, or Price Club—and you can put a preconfigured PC into your shopping cart right next to your office supplies, chicken breasts, and paper towels. Small businesses, corporations, and many individuals can join for a nominal annual fee and take advantage of attractive wholesale prices.

Warehouse clubs work on quantity, not variety. You won't see a lot of brands. But you will see ready-to-go systems from Packard Bell, Leading Edge, and Positive. And now even Dell is venturing into this channel.

This WYSIWYG approach to PC sales is different from the hand-holding at traditional computer dealers or larger





WordPerfect 5.1
We reformat three text files that vary in size from 5K to 55K. The files contain some boldface and underlining; one includes a TIFF image.

dBASE IV 1.1
With the caching feature enabled, we complete an unindexed search for a single record in a 100,000-record parts table. Then we index the table, run the transaction processing module, and post 600 records.

Paradox 3.5
Starting with an orders table, we compare each record with an available stock table. The application finds the current price for the items and inserts the resulting record into an invoice table.

AutoCAD 10
We load a 500K drawing. We then mask layers, change zooms, and remove the hidden lines.

[1] **EISA systems tested with ISA, not EISA, peripherals. Caching EISA controller improved ALR performance on Paradox to 273 seconds.**

mail-order companies, and selection pales before the profusion of choices at a computer superstore. Recognizing this channel's viability, however, Leading Edge jumped on the bandwagon in 1991 and is selling 10 percent of its PCs through clubs. And Positive has taken its commitment to the club phenomenon all the way to the bank by selling its PCs solely through this channel.

Clubs do face stiff competition from superstores, which offer greater customer service and technical support. But Andy Bose of LINK Resources, a research firm based in Manhattan, New York, says that the low-priced PCs available through warehouse clubs will help drive the growth of clubs through the mid-nineties. "Warehouse clubs offer great deals for those who know exactly what they want," says Bose. So if your club carries your dream computer, you can pick it up with your steaks and generate a report right after dinner.

Kris System 48C-3

★★ ★½ **PROS:** Fast 1-2-3 scores, 256K external RAM cache, excellent service and support **CONS:** No easy CPU-upgrade socket

Kris sells through dealers and aims its notebook and full-size PC offerings at small businesses and home offices. Although the $3106 System 48C-3 is a strong performer overall, great marks on our *1-2-3* tests indicate that it's a natural for any memory-intensive task. The big, good-looking black tower came with a big 256K external memory cache, a 210MB hard drive, six free slots, and eight drive bays.

Support is excellent: Kris's toll-free line produced some of our quickest responses and most accurate answers. We have few complaints. The documentation could be better integrated—Kris gives you separate manuals provided by the manufacturers of the motherboard, video board, and I/O board. If you work regularly with spreadsheets or other memory-intensive applications, want top service and support, or just like your PC to have a distinctive appearance, this system is a solid value.

The jet-black Kris is eye-catching, and fast 1-2-3 times show that its beauty isn't just skin-deep.

The D4/33 gives you top performance, a reasonable price, and a long 20-month warranty.

Leading Edge D4/33

★★ ★½ **PROS:** Fast, very small footprint, 20-month warranty, upgradable system **CONS:** 900-number central tech support

You can buy the Leading Edge D4/33 486 through dealers and membership warehouses for a reasonable $3025 and get a free *Windows, Works for Windows,* and *McAfee Viruscan.* This hot PC had great *AutoCAD* numbers, trailing top-dog Touche by a mere 13 seconds. The Leading Edge packs two floppy drives, a 240MB Quantum hard disk, six free slots, and four bays in its tiny footprint. The non-soldered clock crystal design lets you start with a 20- or 25-MHz system. More important to 33-MHz buyers, the Leading Edge supports the new OverDrive CPUs.

Leading Edge has a fine 20-month warranty, and a year's free on-site service costs just $70. Make sure you're happy with your dealer-supplied support, however. If you make many calls to Leading Edge's 900-number technical support line, the charges could really add up. Aside from this drawback, the upgradable D4/33 is a very sound buy.

Micro Express ME 486-33

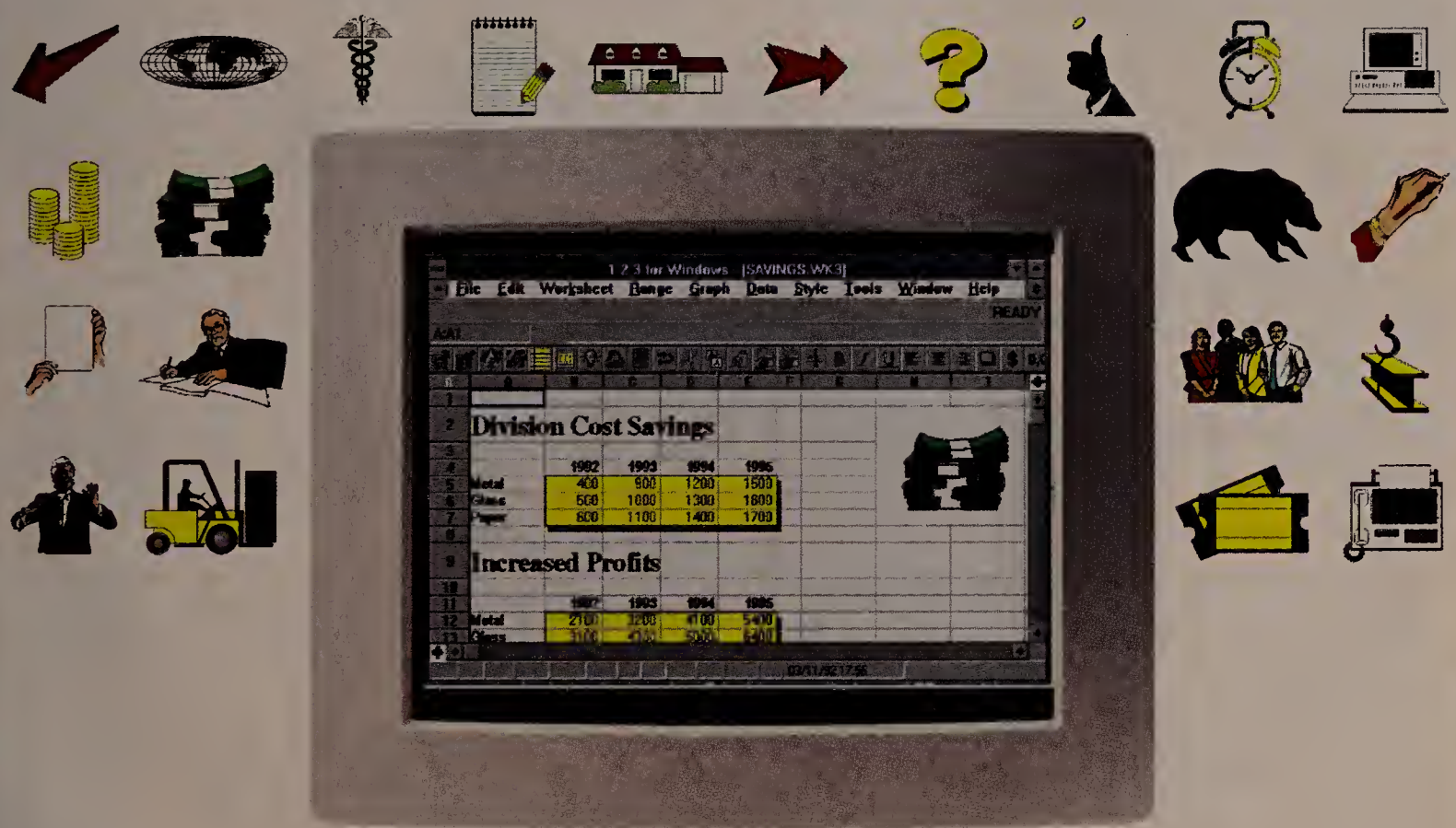
★★ ★½ **PROS:** Top performance, lots of slots and bays, great service and support **CONS:** No easy CPU-upgrade socket

This $3005 tower resembles a compact refrigerator as much as a large PC. Fortunately Micro Express places it on rollers, so it's easy to move around. You can open both side doors on the big case for easy access to the six available expansion slots and eight drive bays. Our test unit came with a quick Quantum ProDrive 240MB hard disk and a 220-watt power supply. And the ME 486-33 is red-hot—with the aid of its 256K external RAM cache, it wound up in a virtual tie with the Touche 486/33 Model 5550T for top overall speed with a first place on *dBASE.*

Micro Express gives you a hinged plastic door to help protect the floppy drives from dust—a nice touch unless you use a lot of floppies, in which case it can get in the way. Technical support is excellent and includes a comforting 24-month warranty. This big machine won't fit well under a desk, but if you want a fast, expandable server, it's a tremendous choice.

This big machine would make a great server, and when it comes to speed, it's hell on wheels.

Upgrade to 1-2-3 for Windows and get the pictures. FREE.



1-2-3 for Windows is now available on CD-ROM, with Multimedia SmartHelp.

Pure Windows.™ Pure 1-2-3.® SmartIcons.™ Full compatibility with previous versions of 1-2-3. Advanced features like 3D spreadsheets and Solver/Backsolver technology. And improved speed and performance in the new release, 1.1.

These are the reasons to upgrade to 1-2-3 for Windows.

The reason to upgrade *right now*? This extraordinary offer from Lotus:

Upgrade to 1-2-3 for Windows from any leading spreadsheet.* Pay just $129. If, after 60 days, you're not 100% satisfied, return the product for a full refund. No questions asked.

And, for a limited time only,** we'll even give you a SmartPics™ Clip-art Sampler absolutely FREE – a $79.95 value. There are over 100 SmartPics, to make your spreadsheet work even harder, communicate better. And they work with any Windows product.

To take advantage of this great upgrade offer, just call*** **1-800-TRADE UP, ext. 6653.** Or use the coupon provided to get more information on ordering. But don't wait – this offer is limited. Get the picture?

Lotus 1-2-3 for Windows

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*Eligible spreadsheet products include Lotus 1-2-3, LotusWorks 1.0, Symphony, Microsoft Excel, and Quattro Pro (1.0, 2.0, 3.0).
**Offer expires September 30, 1992 or while supplies last.
***Please have your credit card and product package ready when you call.

Complete and mail to: 1-2-3 for Windows, Free SmartPics Upgrade Offer, Lotus Development Corporation, PO Box 3900, Peoria, IL 61612-3900.

☐ Send me more information on upgrading to 1-2-3 for Windows.

Name_____
Title_____
Company_____
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State_____ Zip_____
Daytime Phone_____

Which of the following spreadsheets do you currently own?

☐ Microsoft® Excel ☐ Quattro Pro® (1.0, 2.0, 3.0)
☐ Lotus® 1-2-3 ☐ LotusWorks 1.0 ☐ Symphony®

Offer expires on September 30, 1992, or while supplies last. Not to be combined with any other offer. Valid in U.S. only.

EXECUTIVE SUMMARY

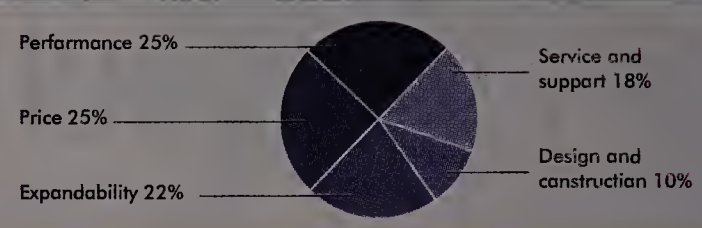
USA Flex's 486/33: Top Star in a Field of Winners

This group's great price/performance ratio makes a convincing argument for buying a 33-MHz 486.

PC WORLD BEST BUY

Whether you want the fastest and least expensive desktop or a powerful behemoth to station in the server room, you can find it among these 33-MHz 486s. The **USA Flex 486 33-MHz Cache System** minitower's super combination of performance, price, expandability, and service win it the coveted PC World Best Buy. Fifteen PCs rate very good or better, and systems from Eltech, Gateway, and Zeos miss a Best Buy by an eyelash.

Key Buying Issues: Percentage of Importance

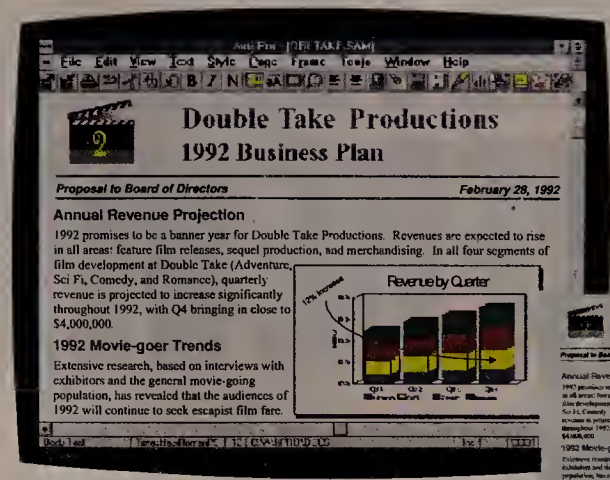


Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Performance	Price	Expandability	Service and support	Design and construction	Overall value
ALR BusinessVEISA 486/33	770	☆☆☆	☆☆	☆☆☆☆	☆☆☆½	☆☆☆☆	★★★
AMKLY 486/33E	771	☆☆☆½	½	☆☆☆☆	☆☆☆☆	☆☆☆☆	★★★
Blackship BLK-486-33MHz	772	☆☆☆½	☆☆☆½	☆☆☆½	☆☆☆☆	☆☆☆	★★★½
Compaq Deskpro 486/33M	773	☆☆☆½	½	☆☆☆½	☆☆☆½	☆☆☆½	★★★
CompuAdd 433	774	☆☆☆½	½	☆☆☆½	☆☆☆½	☆☆☆	★★½
Compudyne 4DX/33 Cache	775	☆☆☆½	☆☆☆☆	☆☆☆	☆	☆☆½	★★★
Dell System 486P/33	776	☆☆☆½	☆☆☆	☆☆☆	☆☆☆☆	☆☆☆½	★★★½
Eltech 4330	777	☆☆☆☆	☆☆☆☆	☆☆☆½	☆☆☆½	☆☆½	★★★½
Everex Tempo M 486/33	778	☆☆☆½	½	☆☆☆☆	☆☆☆	☆☆☆	★★★
FastMicro FastData 486/33	779	☆☆☆☆	☆☆☆☆	☆☆☆½	☆☆☆	☆☆½	★★★½
Gateway 2000 33MHz 486DX	780	☆☆☆☆	☆☆☆½	☆☆☆½	☆☆☆½	☆☆☆½	★★★½
Insight 486-33 ISA Cache	781	☆☆☆☆	☆☆☆☆	☆☆☆½	☆☆☆	☆☆½	★★★½
Kris System 48C-3	782	☆☆☆½	☆☆½	☆☆☆½	☆☆☆☆	☆☆½	★★★½
Leading Edge D4/33	783	☆☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆	★★★½
Micro Express ME 486-33	784	☆☆☆☆	☆☆☆	☆☆☆½	☆☆☆☆	☆☆☆	★★★½
Northgate Elegance ZXP	785	☆☆☆☆	☆☆	☆☆☆☆	☆☆☆☆	☆☆☆½	★★★½
Packard Bell Force 486/33+	786	☆☆½	☆☆☆	☆☆☆½	☆☆½	☆☆½	★★★
Positive PC2000/C433	787	☆	☆☆☆½	☆☆☆	☆☆½	☆☆½	★★½
Reply Model 32 486/33	788	☆☆☆	½	☆☆☆☆	☆☆☆½	☆☆☆½	★★★
Swan 486/33 Power System	789	☆☆☆☆	☆☆½	☆☆☆½	☆☆☆½	☆☆½	★★★½
Tangent M433i	790	☆☆☆½	☆☆☆	☆☆☆½	☆☆☆½	☆☆☆	★★★½
Touche 486/33 Model 5550T	791	☆☆☆☆	☆☆½	☆☆☆½	☆☆☆	☆☆☆	★★★½
USA Flex 486 33-MHz Cache System	792	★★★★	★★★★	★★★½	★★★½	★★★	★★★★
Wyse Decision 486/33	793	☆☆☆½	½	☆☆☆	☆☆☆	☆☆☆	★★½
Zeos 486DX-33	794	☆☆☆½	☆☆☆½	☆☆☆☆	☆☆☆½	☆☆☆½	★★★½

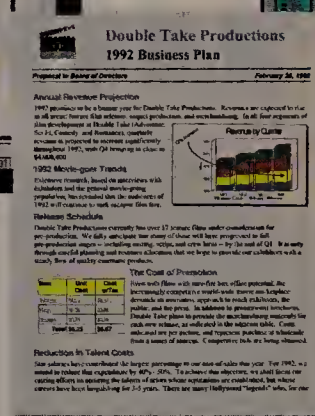
Overall value is calculated by multiplying each category rating by its weight percentage, summing the results, and rounding to the nearest half number.

No other word processor features a customizable icon palette, which we call SmartIcons,™ giving you "one-click" access to all your most frequently used tasks. Place them anywhere you want on the screen, or even create new ones.



With its unique pop-up Status Bar, Ami Pro 2.0 lets you quickly access or change type styles, fonts and sizes. Which means you'll save even more time.

Only Ami Pro 2.0 is truly WYSIWYG. So your output will be precisely what appears on screen. No matter what printer you have.



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"Ami Pro 2.0 sets the Windows standard for visually impressive word processing."

–PC Magazine, 2/25/92

Ami Pro™ 2.0 doesn't just run in Windows,™ it's designed to get the most out of Windows. We call it Visual Word Processing because it lets you work the way you think. So you can turn out letter perfect, picture perfect documents with half the effort in half the time. And since it's fully integrated with all of our Windows products, you can move information quickly from one application to another with no hassle at all.

PC MAGAZINE EDITORS' CHOICE
February 25, 1992
Ami Pro, Version 2.0

To upgrade to Ami Pro 2.0 from another word processor for only $129, or for a free working model, call* **1-800-TRADEUP, ext. 6518.**

Ami Pro for Windows

Lotus

*Offer expires December 31, 1992. Call for a list of eligible word processors. Education priced Lotus products not included. Not to be combined with any other offer. *Please have your credit card and current word processor ready when you call. In Canada call **1-800-GO-LOTUS.** ©1992. Samna Corporation. All rights reserved. Lotus is a registered trademark and SmartIcons is a trademark of Lotus Development Corporation. Ami Pro is a trademark of Samna Corporation, a wholly-owned subsidiary of Lotus Development Corporation. Windows is a trademark of Microsoft Corporation. Adobe Type Manager and the ATM logo are registered trademarks, in the United States, of Adobe Systems Incorporated.*

Circle 175 on reader service card

PRINTERS THAT WORK WHEREVER YOU WORK

Now there's a Kodak Diconix printer for you, wherever and whenever you work. Who gives you a choice of mobile and portable printers? Kodak!

Some people want a quality desktop printer that's small and light enough to carry between home and office. Some people want a printer that's compact and rugged enough to print anywhere, anytime. Now Kodak offers both!

A compact pro, the mobile desktop printer.

The new Kodak Diconix 701 printer delivers professional-quality text and graphics on your

desktop. The kind you're proud to present, or send on your letterhead. Yet it's so compact and light, you can easily slip it in your briefcase when there's weekend work to be done. Its footprint is literally smaller than an ordinary sheet

KODAK

of paper, even with the built-in 30-sheet feeder. And, just in case you want to print between home and office, there's an optional battery. ***The one for the road: a remarkably rugged portable printer.***

But if you often print on the go, see the Kodak Diconix 180si printer.

This is a true portable, incredibly light and compact, yet ruggedly reliable. It keeps on printing whether you're working at 40,000 feet, or in the back of a truck not far above sea level. And it offers unbeatable value – see for yourself, talk to your dealer.

Wherever you work, don't wait: call for the name of a dealer of Kodak printers near you in the U.S. and Canada.

1 800 344-0006, Ext. 413.

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Circle 101 on reader service card

Northgate Elegance ZXP

★★½ **PROS:** Fast, variable clock, ZIF socket, excellent support, graphics accelerator
CONS: A little expensive

Interested in the latest and greatest? Take a look at the Northgate Elegance ZXP tower. The system can use CPUs from 16-MHz 486SX to the ultrahot 66-MHz DX2 (as soon as it ships), and so fits in as a workstation or a server. Upgrading's a snap: Lift the lever on the Zero Insertion Force (ZIF) socket, remove the old CPU, plug in the new, and move a jumper or two to change your clock setting. The 33-MHz 486DX we reviewed is already a four-star performer with super *AutoCAD* marks.

The Elegance has plenty of peripherals capacity with six free slots, seven bays, and a 220-watt power supply. You get *Windows, DiagSoft QAPlus* diagnostics, a *Windows* accelerator, a superb Omnikey 101 keyboard, and great documentation. Rock-solid help includes year-round 24-hour-a-day tech support and a year's free on-site service. If you can afford $3549, the Elegance ZXP is worth every penny.

The ZXP's ZIF socket and switchable clock speeds let you install and run 486 CPUs from 16 to 66 MHz.

It's not the fastest or cheapest, but the Packard Bell is one of only two in our review with a ZIF socket.

Packard Bell Force 486/33+

★★★ **PROS:** ZIF socket, software bundle, free modem, two floppies
CONS: Limited bays, small 150-watt power supply

Packard Bell PCs are in many computer superstores, membership warehouses, and discount outlets. You can buy a Force 486/33+ for $3059 and get a second floppy drive, 2400-baud internal modem, *Windows, LotusWrite,* Packard Bell's version of *1-2-3 for Windows, Lotus SmartPics* starter kit, a Prodigy starter, and a set of tutorials. This system even has a ZIF socket, which means an easy upgrade to a 50-MHz or faster clock doubler. This compact is clearly intended for the desktop, with just four free slots, a light-duty 150-watt power supply, a 210MB hard disk (Packard Bell's largest option), and four drive bays.

The Force 486/33+ran near the bottom on all our speed tests. Support includes a year of free on-site service, but responsiveness on the toll-free line was poor. This could be an easily upgradable workstation, but you can buy faster machines for less.

Positive PC2000/C433

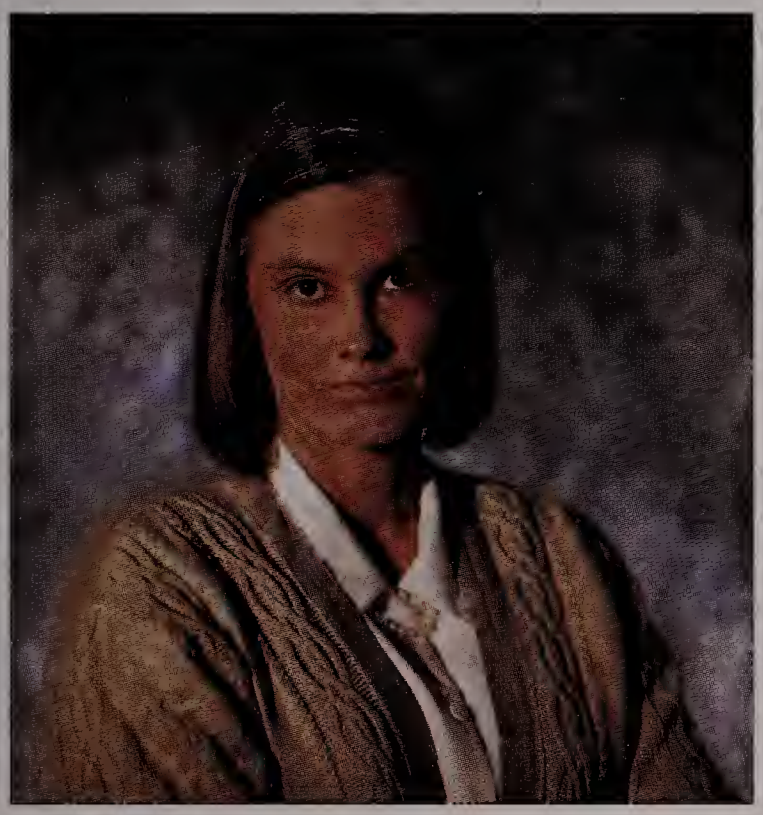
★★½ **PROS:** Unique CPU-cartridge upgrade, excellent software and fax-modem bundle, 8MB RAM **CONS:** Slowest machine in roundup, fragile front cover

You'll find the $2999 Positive PC2000/C433 at membership warehouses. And at first glance, it's the perfect impulse buy. You match one base system with a choice of cartridge-mounted CPUs. You can start with a $2100 20-MHz 386SX and upgrade to a 33-MHz 486 by opening the front cover and swapping in an $1100 cartridge CPU. You get a dual-floppy unit, a 200MB hard disk, *Windows, Microsoft Works, Microsoft Productivity Pack, WinFax* software, a fax-modem, four free slots, and four drive bays.

Sound like a sweet deal? Not quite—the CPU upgrade scheme leaves you saddled with a 16-bit memory bus. The Positive ran dead last on every test, taking almost twice as long as the leader at *dBASE* and *AutoCAD;* its scores even trailed those of the top 25-MHz 486SX in our March review on every test except *1-2-3.* Other problems include a fragile front cover. All in all, you're better off looking elsewhere.

The Positive has a simple CPU swap, but its 16-bit memory bus knocks it out of the performance race.

In California, Upgrades Are A Way Of Life



Before

After

So Where Do You Think The Best Upgradables Come From?

California isn't all movie stars, plastic surgeons and New Age cultists. It's also home to some of ıe best PC designers in the world. Many of whom work right here at PC Brand.

Since the local culture values minimal exertion, we made our computers as easy to upgrade as ɔpping a videotape into your VCR. Upgrading the hard drive is equally untaxing. All in all, a ·freshing alternative to the intimidating upgrade process that our competitors require: unscrewing ɔvers, replacing motherboards, jamming delicate chips into sockets.

And while our upgrade cartridges are unique, the processors inside are industry-standard. Because ne thing we won't upgrade you to is a white elephant.

Of course, you probably aren't going to buy a PC just because it's easy to upgrade. In which case ɔu may be attracted by our other innovations: an Intelligent Write Buffer™ that speeds 80% of all rocessor operations; more efficient power management; a BIOS with built-in convenience features. r by the fact that, spec for spec, PC Brand computers typically offer more RAM, more disk storage,

UPGRADE YOUR THINKING TO PC BRAND'S.

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386/SLC-50 Cache $1695
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486/SX-25 $1995
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386/33 Cache $2095
LEASE: $80/MONTH
• 64K cache • Intelligent Write Buffer™

486/33 $2495
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• Intelligent Write Buffer™

Plus these standard features on all upgradable systems:

4MB RAM expandable to 32MB • 105MB IDE, 16ms hard drive • 1.44MB, 3.5" drive • 1.2MB, 5.25" drive • 16-bit VGA • Super VGA color monitor (1024 x 768 resolution) • 1 parallel port/2 serial ports and 7 expansion slots • 101-key enhanced keyboard • Serial mouse • MS-DOS® 5 • MS Windows™ 3.1

MOVE UP TO MULTIMEDIA FOR A SONG. $599

• Sound Blaster Pro audio card from Creative Labs • High capacity internal CD-ROM drive; MPC compliant • Top quality stereo speakers with internal amplifier; volume, bass & treble boost controls • MS® Works for Windows™ Multimedia • MS® Bookshelf for Windows™ Multimedia • Software Toolworks® Illustrated Encyclopedia Sherlock Holmes Consulting Detective Interactive Game

Multimedia components will be installed on system if purchased with upgradable system.

d better graphic resolution than comparably priced computers from our competition.

And those are just the specs you can measure. PC Brand systems have the reassuring feel of ality. If our computer were a car, the doors would slam with a solid, satisfying click. Which goes a ng way toward explaining why, even with a 30-day, no-questions-asked, moneyback guarantee, we ll can't get them back!*

As the following pages demonstrate, PC Brand also offers e of the most complete product lines in the business. With *vikShip*™ same-day shipment of popular configurations*.** service no doubt inspired by another California tradition: stant gratification.

full-year 100% parts and labor coverage, free on-site service, unlimited toll-free phone, FAX and bulletin board nical support may also have something to do with it. **QwikShip products shipped same day if in stock and ordered by Central Time; subject to credit approval; must be configured as shown; please call for availability.

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486/SLC Notebook $1995

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2½ times the speed of a 386/SX-25!*

• 486SLC Processor • 80MB IDE, 17ms hard drive • 2MB RAM expandable to 16MB • 1.44MB, 3.5" drive • Paper white VGA, no glare CCFT backlit LCD • 640 x 480 resolution, 32 gray shades • supports an external VGA • 1 parallel port/2 serial ports • external keyboard port • MS-DOS® 5 • Leather carrying case • 8.66" x 11" x 2.08", 6.5 lb. • 386/SX-25 NOTEBOOK also availab

**Landmark V2.00 performance test*

A TOWER OF STRENGTH YOU CAN LEAN ON.

NEW

486/50 EISA Cache $4495

LEASE: $158/MONTH

• 486, 50MHz Processor • 200MB IDE, 12ms hard drive • External zero-wait state • 64KB static RAM cache • 8MB RAM expandable to 64MB • 1.44MB, 3.5" drive • 1.2MB, 5.25" drive • 16-bit SVGA, 1MB • Super VGA color monitor (1024 x 768 resolution) • 1 parallel port/2 serial ports • 101-key enhanced keyboard • Serial mouse • MS-DOS® 5 • MS Windows™ 3.1 • Tower case with 8 drive bays • Intelligent Write Buffer™ • 486/33 EISA CACHE also available

SAME-DAY SHIPMENT ON OUR LEADER SERIES

(AND THERE'S EVEN A CACHE)

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QwikSh

Leader systems include:

• 64K cache • 4MB RAM expandable to 32MB • 105MB IDE, 16ms hard drive • 1.44MB, 3.5" drive • 1.2MB, 5.25" drive • 16 bit SVGA, 1MB • Super VGA color monitor (1024 x 768 resolution) • 1 parallel/2 serial ports • 101-key enhanced keyboard • Serial mouse • MS-DOS® 5 • MS Windows™ 3.1

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The People's Choice.

Intel's OverDrive Upgrade to 66 MHz

by Rex Farrance

Until recently, the 33-MHz 486 represented the high watermark of PC processor evolution. The 50-MHz 486DX changed that, but at high cost. An easy, relatively inexpensive upgrade is coming for many 33-MHz 486DXS—Intel's new double-speed 486 OverDrive chips. These CPUs boost internal processing to 66 MHz without an upgrade to the 33-MHz system clock. Performance increases will vary in actual application.

The easiest upgrades will come from your system vendor, especially if you also need a BIOS upgrade, but not all vendors plan to provide upgrades for existing systems, although most will sell an OEM version of the OverDrive CPU called the 486DX2 in new models.

You'll usually need a chip puller and a steady hand to extract the old 486/33DX without damaging the motherboard. The ideal swap comes with the newest motherboard designs, which have easy-extraction CPU slots like the Zero Insertion Force socket on the Northgate Elegance ZXP and Packard Bell Force 486/33+. These sockets give you an instant no-tools upgrade.

Reply Model 32 486/33

★★★ **PROS:** Micro Channel bus, IBM SCSI cache controller with 512K of RAM, upgradable CPU, PS/2 keyboard **CONS:** As expensive as EISA systems

The Reply Model 32 486/33 is the only Micro Channel (MCA) PC here. MCA PCs take 32-bit peripherals, but MCA only. The Reply is well designed, with an easy-open thumbscrew case and a system board with integrated I/O, VGA, floppy controller, and ESDI interface. It uses a CPU card for easy processor upgrades. The system comes with an IBM SCSI caching controller, 240MB Quantum hard drive, four free MCA slots, five bays, a 200-watt power supply, and top dog 128MB RAM limit. You even get a bona fide PS/2 keyboard.

Reply's support is very good, and you can get a year of on-site service for just $48. The 486/33's $4402 street price is steep compared to most of the ISA machines, but it's right in the ballpark with the EISA computers. If you subscribe to Big Blue's vision of the future, the Reply lets you maintain your PS/2 compatibility for much less than IBM charges.

You don't have to pay IBM prices to get a PS/2 compatible with a genuine PS/2 keyboard.

The Swan 486/33 turns up the heat with four-star performance—and two years of on-site service .

Swan 486/33 Power System

★★½ **PROS:** Very fast, lots of slots and accessible bays, two years on-site service, 8MB RAM standard **CONS:** A bit pricey, no easy CPU-upgrade socket

Like most Swan PCs we've tested, the 486/33 Power System pumps out shellac-blistering performance. It came in first on *Windows* and trailed the leader on *1-2-3* and *WordPerfect* by scant seconds. With its quick 240MB Conner C2235 hard disk, it also clocked a close second on *dBASE*. This full-size desktop unit has five of six drive bays externally accessible, so you're set if you want to add an internal CD ROM player, tape backup, rewritable optical, or removable media drive to supplement the two floppy drives. You also get six free slots, 8MB of RAM, *Windows*, *Microsoft Works for Windows*, *Quicken for Windows*, and *Wealth Builder*.

Swan gives you two years of free on-site service. Granted, at $3395 the Swan isn't the cheapest 33-MHz 486 system you can find. But if you want great performance, plenty of accessible drive bays, and worry-free support, the Power System is well worth the outlay.

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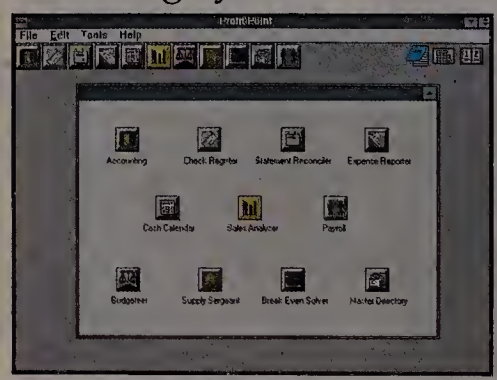

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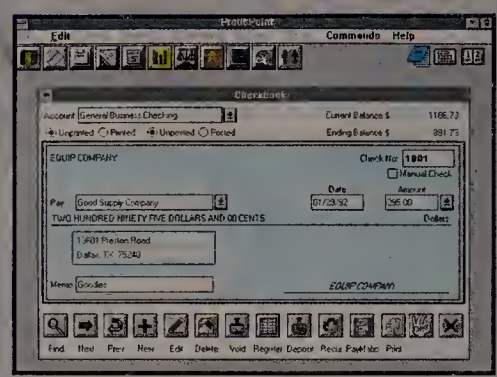

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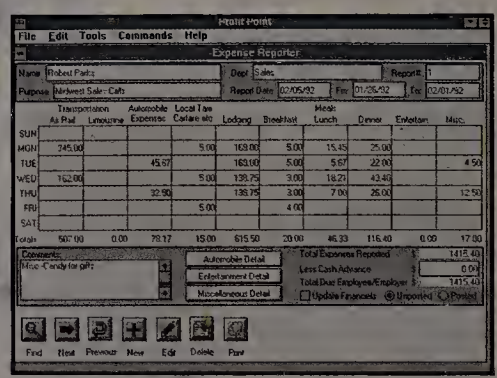

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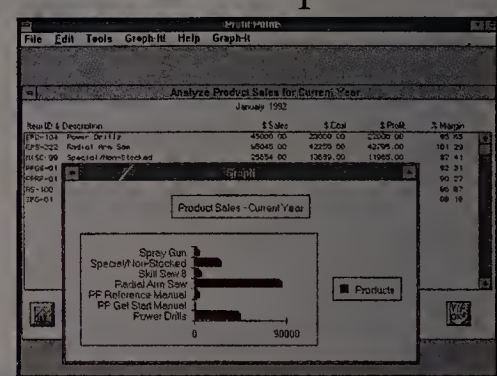

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MT908 HP LaserJet III®

Okay, here's a hint. The market ading laser printer features HP® PCL5 inter control language. The MT908 ser printer from Mannesmann Tally is CL5 compatible, as well. Oops. The arket leader provides 8 scalable fonts. ne MT908 gives you the same scalable nts. Hmm. The market leader offers a ature for smoother edges on fonts and aphics. The MT908 has Edge Enhanced echnology (EET®) for the same effect.

Alright. What about performance? he market leader prints at 8 pages per inute and includes the processing power the Motorola 68000. The MT908 prints 8 pages per minute but provides 2.5 mes faster processing of scaled fonts and aphics with its Intel i80960 RISC processor. Now we're getting somewhere.

The market leader comes with a 250 sheet capacity letter-size cassette. If you want to load legal paper, envelopes etc., you'll have to buy additional cassettes. For more convenient paper handling, the universal paper cassette of the MT908 adjusts to hold 250 sheets of letter, legal and international sizes or up to 30 envelopes. And, there is an optional 300 sheet second paper bin that mounts under the MT908 ... you can't even buy that from the market leader.

Bottom line: the Mannesmann Tally MT908 gives you all the features of the market leader with faster processing for faster throughput, better paper handling and has a list price of only $1,995... $400 less than the market leader*.

You can even add built-in PostScript® language compatibility.

So any way you figure, the answer comes up the same. The MT908 looks better, and so does the price.

For the name of your nearest dealer call:

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Best of the Rest: So Many PCs, You Can't Cover Them All

Today's hot marketplace has too many PCs to examine in one review. Here are 37 more 486s to consider.

Model	List price [1]	Hard disk size (MB)	Fast-RAM capacity (MB)	Free 32-bit slots	Free 16-bit slots	Free 8-bit slots	Drive bays	Compact footprint	Warranty (months)	On-site service: available	On-site service: under $100 per year	On-site service: free
AcerPower 486/33	$4584	120	50	0	4	0	6	Y	12	Y	N	N
AcerPower 500	$5794	240	128	6	0	0	4	N	12	Y	N	N
American Mitac D4033	$2895	200	32	7	0	0	5	Y	12	N	n/a	n/a
Arche Legacy 486-33	$5201	200	32	0	6	2	5	N	24	Y	N	N
ATI-486/33	$2389	200	64	1	5	1	5	N	12	Y	Y	N
Bell 4133GT	$4495	200	32	3	4	1	6 [2]	N	24	Y	Y	Y
Club Falcon 433D	$2999	240	64	0	5	0	4	N	12	Y	Y	Y
Club Falcon 433DL	$2999	240	64	0	5	0	5	N	12	Y	Y	Y
Club Falcon 433T	$3099	240	64	0	5	0	9	Y [3]	12	Y	Y	Y
CompuTrend Premio 486-33	$2100	210	32	1	6	2	5	N	12	[4]	[4]	[4]
Copam 486V/33	$3864	210	32	0	5	0	7	Y [3]	12	Y	Y	Y
Copam 486B/33	$3487	210	16	0	4	0	4	Y	12	Y	Y	Y
Copam 486EV/33	$4297	210	32	5	0	0	7	Y [3]	12	Y	Y	Y
CUI Advantage 486-33	$2995	244	32	0	6	0	10	Y [3]	12	Y	Y	Y
DTK Grafika 4A	$3495	240	32	0	6	0	5	Y	12	Y	Y	Y
EPS 486/33	$2195	213	64	1	6	1	8	Y [3]	12	Y	Y	Y
Epson EISA Series	[5]	200	64	5 [6]	0	0	5 [7]	N [3]	12	N	n/a	n/a
Hyundai Corporate Series 486/33E	$4484	300	96	7	0	0	6	Y [3]	18	Y	N	N

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Tangent M433i

★★ ★½ **PROS:** Compact minitower case, very good service and support
CONS: No easy CPU-upgrade socket.

Tangent sells a line of fast, competitively priced systems direct, and the $3190 M433i fits right in. This minitower takes up very little space on your desktop, and it gives you plenty of room to grow with five free slots and five drive bays. The Tangent M433i delivered good performance on the memory-intensive *1-2-3* test, but its *dBASE* times were only middling. So if a disk-intensive program like this is your main application, you might want to add Tangent's $350 caching controller to the 210MB Western Digital Piranha 4200 hard disk.

Tangent provides a *Windows* accelerator, *Windows*, a year of free on-site service, a 30-day money-back guarantee, and a toll-free connection to technicians who are courteous and knowledgeable. There's not much to kick about on this system. While the M433i doesn't take top honors in any category, it's a very attractive package.

This quick little minitower gives you great support and plenty of room for internal expansion.

Model	List price [1]	Hard disk size (MB)	Fast-RAM capacity (MB)	Free 32-bit slots	Free 16-bit slots	Free 8-bit slots	Drive bays	Compact footprint	Warranty (months)	On-site service: available	On-site service: under $100 per year	On-site service: free
IBM PS/2 Model 90XP 486	$10,561 [8]	160	32	3	0	0	2	N	12	Y	[9]	[9]
IBM PS/2 Model 95XP	$12,661 [8]	400	32	6	0	0	4	Y	12	Y	[9]	[9]
Memorex Telex 8090 Personal Computer	$3555	200	32	0	6	0	4	Y	12	Y	Y	Y
Memorex Telex 8290 Personal Computer	$4855	200	16	5	0	0	5	Y	12	Y	Y	Y
Memorex Telex 8420 Personal Computer	$7105 [8]	200	64	6	1	0	8	Y [3]	12	Y	Y	Y
MIS Computer Systems M433 (ISA)	$2495	210	64	1	5	0	8	Y [3]	12	Y	Y	N
MIS Computer Systems M433E (EISA)	$2795	213	64	1	4	0	8	Y [3]	12	Y	Y	N
NCR System 3345	$6060	200	4	3	1	5	3	Y	12	Y	[11]	[11]
NEC PowerMate 486DX/33i	$5027 [10]	240	36	0	4	0	4	N	12	Y	[12]	N
Olivetti PC Pro 486/33	$3449	120	36	0	3	0	3	Y	12	Y	Y	Y
Olivetti PC Pro 486/33 mt	$3859	120	36	0	5	1	5	Y [13]	12	Y	Y	Y
PC Brand 486/33	$2695	200	32	0	6	1	4	N	12	Y	Y	Y
PC Brand 486/33 EISA Cache	$4395	200	64	6	2	0	8	Y [3]	12	Y	Y	Y
Samsung SystemMaster 486/33TE	$5973 [14]	200	32	7	0	0	7	Y [3]	12	Y	[12]	[12]
Tandon 486-33	$6609	200	64	6	2	0	8	Y [3]	12	Y	Y	Y
Tandon Option	$4044	200	32	0	6	1	4	N	12	Y	Y	Y
Tandy 4833 LX/T	$5498	202	64	0	6	0	5	Y [3]	12	Y	[11]	N
Twinhead Superset 600/433C	$2499	200	32	0	4	0	4	Y	12	Y	Y	Y
ZDS Z-486/33E	$6599	200	64	3	0	0	3	Y	12	Y	N	N

[1] With 4MB RAM, 200MB to 240MB hard disk, 1.2MB or 1.44MB floppy drive, VGA and VGA color monitor, keyboard, mouse, and DOS 5.0.
[2] Available as a tower or a desktop; tower has 5 drive bays.
[3] Tower.
[4] If customer buys from CompuTrend, service is free; otherwise, dealer determines service policies.
[5] Shipping May 1992 in both tower and desktop models; price not available at press time; mouse not included.
[6] Tower has 8 free 32-bit slots.
[7] Tower has 6 drive bays.
[8] With 8MB RAM.
[9] Price determined by dealers.
[10] Mouse not included.
[11] May be free or vendor may charge, depending on service required.
[12] Price depends on service required.
[13] Minitower.
[14] VGA card and mouse not included.

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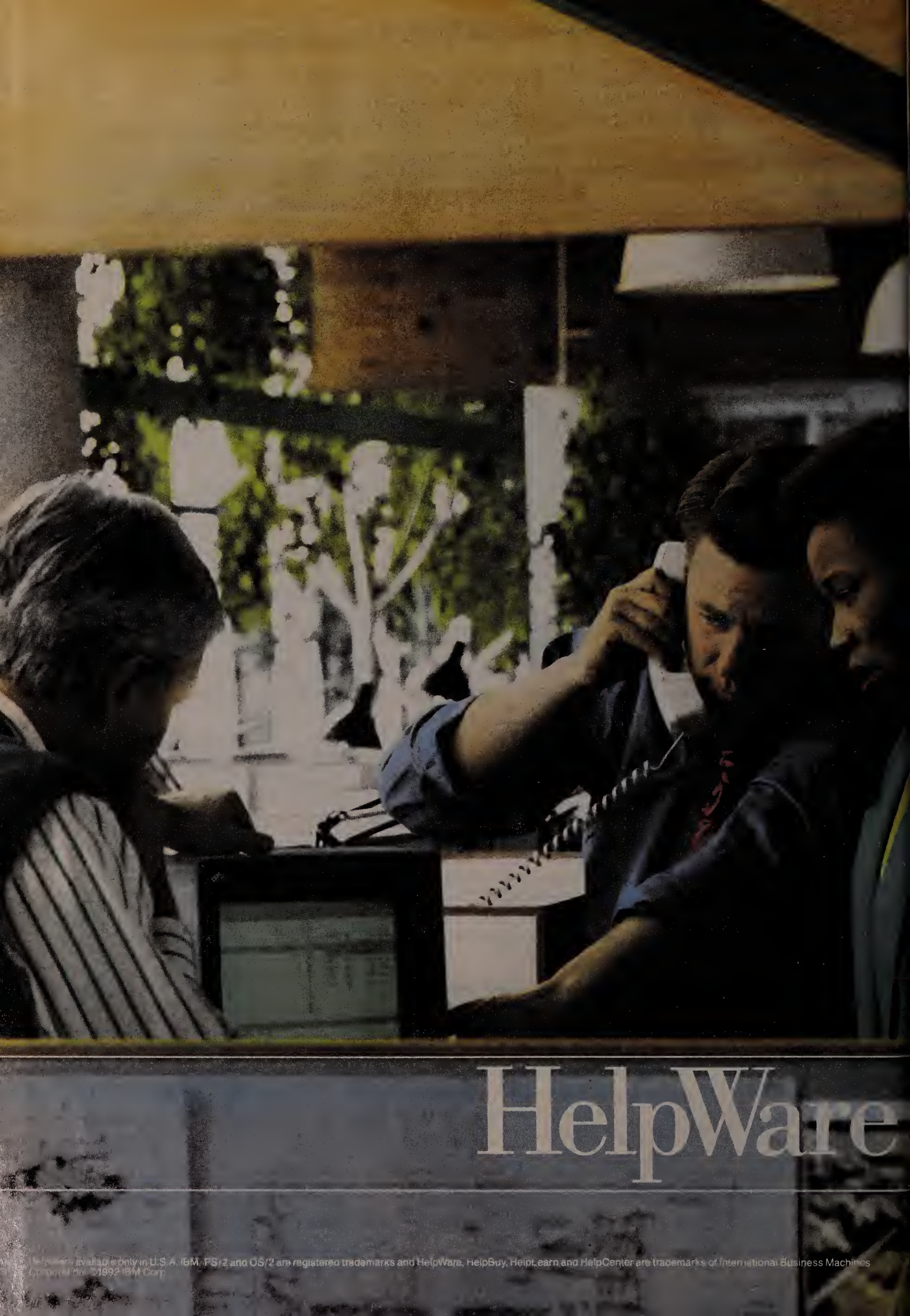
Touche 486/33 Model 5550T

★★ ★½ **PROS:** Fastest system in roundup, 8MB RAM, caching controller, two-year warranty **CONS:** Somewhat expensive

How hot can a personal workstation (or server) get? Check out the top-gun scores of the big Touche 486/33 Model 5550T. It came in first on *WordPerfect*, aced the tough *AutoCAD* benchmark, and tallied great numbers on every other test. Inside the Touche's heavy tower case you'll find nothing but quality components, including an American Megatrends (AMI) motherboard, 8MB of RAM, two floppy drives, a 1MB caching IDE controller, a 240MB Quantum hard disk, six free slots, eight bays, and a powerful 300-watt power supply. And to make sure you don't get lost, Touche labels every electrical lead and port.

A generous 24-month warranty forms the cornerstone of Touche's solid support. The Touche's $3274 price may be a stretch for the budget-minded office, but if you want a fast, high-quality machine with a great warranty and plenty of growing room, you won't go wrong with the Touche.

It doesn't get faster. The Touche's roomy 486/33 Model 5550T delivered first-place performance.



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USA Flex 486 33-MHz Cache System

★★ ★★ **PROS:** Very fast, low price, lifetime labor warranty, two floppy drives standard
CONS: No easy CPU-upgrade socket

Overall, the USA Flex 486 33-MHz Cache is about as good as it gets. The $2634 price is right, and top marks on *1-2-3* distinguish it as a super machine for any memory-intensive application. You'll be pleased to know the USA Flex, with its graphics accelerator, ran just 4 seconds behind the *Windows* leader. But if you run *dBASE*, you might want to add a caching controller: USA Flex will sell a 1MB model for $450. The space-saving minitower gives you six slots and five bays, four of which are front accessible. You'll get *Windows*, a second floppy drive, and *PFS WindowWorks*.

Service and support are terrific. You get a 30-day money-back guarantee, 24-hour-a-day tech support, a year of free on-site service, and an outstanding lifetime warranty on labor. Stack up everything the USA Flex has to offer, and you wind up with a Best Buy that's all business.

The USA Flex 486 33-MHz Cache System combines speed, price, and service and takes the Best Buy.

The Wyse Decision 486/33 is an attractive PC, but its price is a bit behind the times.

Wyse Decision 486/33

★★ ½ **PROS:** Great keyboard, good dBASE and Windows scores, fine manuals
CONS: Expensive, hard-to-access SIMMs, no easy CPU-upgrade socket

The Wyse Decision 486/33 is a good-looking full-size desktop system with one of the best keyboards in the roundup. And the Wyse is a good performer at *dBASE*, *1-2-3*, and *Windows*. Inside you'll find six slots and four bays. If you want to upgrade your memory, you'll have a hard time getting through the tangle of power and drive cables to access the SIMM sockets. Wyse thoughtfully placed the reset and turbo buttons on the front, but you'll have to reach to the right for the on/off switch.

Wyse service is good, but we did get some inaccurate responses to our technical queries. Fortunately, the documentation is excellent. The only really bad news here is the stiff $4583 street price, the third highest in the roundup—the only machines that were more expensive were both EISA boxes. The Decision 486/33's attractive appearance might tantalize, but you can get more for your money.

Zeos 486DX-33

★★ ★½ **PROS:** Upgradable CPU, seven free slots, eight bays, 8MB RAM, 300-watt power supply, bundled software **CONS:** No standard external memory cache

If Lotus's top applications suit you, this is the best buy here. For $3245, Zeos throws in *Ami Pro 2.0* and *1-2-3 for Windows* (street value over $700) and *WinRIX 1.0*, upgradable to version 1.1 for $179 ($395 list). The standard 8MB of RAM and second floppy sweeten the bundle. At press time, Zeos added the Diamond Stealth Hicolor video board, a PC World Best Buy in March. (Our tests don't reflect this addition.)

The 486DX-33 lagged at data bases, but Zeos has since changed to a faster drive, the 14-ms WD Caviar 212MB. A 50-MHz clock-doubler and a 50-MHz DX cost only $200 and $300 extra, respectively, and a 128K external memory cache is $200. The desktop model costs $150 less than the tower we tested. Zeos gives 24-hour toll-free support, a 30-day money-back guarantee, and a year of on-site service with one-day turnaround for $49 (you must buy this option within 30 days of purchase).

Ready to make a move to 1-2-3 for Windows? Check out Zeos's attractive software bundle.

Now Windows is as easy to use as DOS.

Microsoft® Windows® is capable of great and wonderful things.

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That's because Program Manager insists on grouping your programs into five arbitrary categories: "Windows Applications," "Non-Windows Applications," "Accessories," "Games" and "Main."

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Direct Access, on the other hand, gives you a multitude of utterly sensible program groupings – 17 of them.

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AMKLY 486/33E
AMKLY Systems
60 Technology Dr.
Irvine, CA 92718
800/367-2655,
714/727-9521 (fax)
ACCESSORIES: 2MB RAM $175, 512K video RAM upgrade $35
Reader service no. 771

Blackship BLK-486-33MHz
Blackship Computer
2031 O'Toole Ave.
San Jose, CA 95131
800/531-7447,
408/432-1443 (fax)
ACCESSORIES: 4MB RAM $200, 330MB ESDI drive/controller upgrade $600
Reader service no. 772

Compaq Deskpro 486/33M
Compaq Computer
P.O. Box 692000
Houston, TX 77070
800/345-1518
ACCESSORIES: 4MB RAM $439, 340MB drive $1000, 2400-baud internal modem $399, 80MB/120MB tape drive $899
Reader service no. 773

CompuAdd 433
CompuAdd Computer
12303 Technology Blvd.
Austin, TX 78727
800/456-3116,
512/250-1489
ACCESSORIES: 4MB RAM $199, upgrade from 200MB to 330MB SCSI drive/controller $700
Reader service no. 774

Compudyne 4DX/33 Cache
Compudyne Direct
15151 A Surveyor Blvd.
Addison, TX 75244
800/932-2667,
214/702-0055
ACCESSORIES: 4MB RAM $200, upgrade to 330MB SCSI drive/controller $599
Reader service no. 775

Dell System 486P/33
Dell Computer
9505 Arboretum Blvd.
Austin, TX 78759-7299
800/289-3355,
512/338-8700 (fax)
ACCESSORIES: 4MB RAM $200, 320MB IDE drive upgrade $350, 50-MHz DX2 processor $100, drive $79, dual floppy drive $79
Reader service no. 776

Eltech 4330
Eltech Research
47266 Benicia St.
Fremont, CA 94538
800/358-8330,
510/438-0663 (fax)
ACCESSORIES: 4MB RAM $240, floppy drive $60, 300MB IDE drive upgrade $489, 250MB tape backup $399, 16-inch monitor upgrade $750, CD ROM drive $499
Reader service no. 777

Everex Tempo M 486/33
Everex Systems
48431 Milmont Dr.
Fremont, CA 94538
800/992-3839,
510/498-1111
ACCESSORIES: 4MB RAM $399, floppy drive $105, 338MB ESDI drive/controller upgrade $858, 120MB tape backup $359
Reader service no. 778

FastMicro FastData 486/33
FastMicro
4405 E. Baseline Rd.
Phoenix, AZ 85044
800/821-9000,
602/431-8300 (fax)
ACCESSORIES: 4MB RAM $200, 660MB ESDI drive/controller upgrade $800
Reader service no. 779

Gateway 2000 33-MHz 486DX
Gateway 2000
610 Gateway Dr.
North Sioux City, SD 57049
800/523-2000,
605/232-2023 (fax)
ACCESSORIES: 4MB RAM $160, 340MB SCSI drive/controller upgrade $350, tower case upgrade $100, 120MB internal tape backup $295, 15-inch 1280 by 1024 color display upgrade $150
Reader service no. 780

Insight 486-33 ISA Cache
Insight Computers
1912 W. Fourth St.
Tempe, AZ 85281
800/755-9628,
602/350-1176
ACCESSORIES: 4MB RAM $199, CD ROM drive $299, 80/120MB tape backup $199, 17-inch Viewsonic monitor $899
Reader service no. 781

Kris System 48C-3
Kris Technologies
260 E. Grand Ave.
South San Francisco, CA 94080
800/282-5747,
415/877-8048 (fax)
ACCESSORIES: 4MB RAM $196, upgrade to 360MB SCSI drive/controller $760, 120MB tape backup $245, floppy drive $69
Reader service no. 782

Leading Edge D4/33
Leading Edge Products
117 Flanders Rd.
Westborough, MA 01581
800/874-3340,
508/836-4800
ACCESSORIES: 4MB RAM $499, 400MB IDE drive upgrade $700
Reader service no. 783

Micro Express ME 486-33
Micro Express
1801 Carnegie Ave.
Santa Ana, CA 92705
800/989-9900,
714/852-1400
ACCESSORIES: 4MB RAM $240, upgrade to 300MB ESDI drive/controller $600, 250MB tape backup $350, 2400-baud internal modem $99
Reader service no. 784

Northgate Elegance ZXP
Northgate Computer
7075 Flying Cloud Dr.
Eden Prairie, MN 55344
800/548-1993,
612/943-6965 (fax)
ACCESSORIES: tower case upgrade $150
Reader service no. 785

Packard Bell Force 486/33+
Packard Bell Electronics
9425 Canoga Ave.
Chatsworth, CA 91311
818/886-9998,
818/773-9558 (fax)
Reader service no. 786

Positive PC2000/C433
Positive
9174 Deering Ave.
Chatsworth, CA 91311
800/252-6345
ACCESSORIES: CD ROM $450
Reader service no. 787

Reply Model 32 486/33
Reply
4435 Fortran Dr.
San Jose, CA 95134
800/955-5295
ACCESSORIES: 150/250 internal tape backup/adapter $1495, 1.2MB floppy drive $145, 1.44MB floppy drive $145, 2.88MB floppy drive $290, 4MB RAM $390, extended memory adapter $495
Reader service no. 788

Swan 486/33 Power System
Swan Technologies
3075 Research Dr.
State College, PA 16801
800/468-9044,
814/237-4450 (fax)
ACCESSORIES: 4MB RAM $260, tower case upgrade $150, 310MB SCSI drive/controller upgrade $500
Reader service no. 789

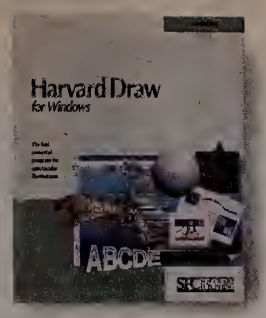
Tangent M433i
Tangent Computer
197 Airport Blvd.
Burlingame, CA 94010
800/223-6677,
415/342-9380 (fax)
ACCESSORIES: 4MB RAM $196, floppy drive $69, 17-inch VESA 1024 by 768, flat-square display monitor $690
Reader service no. 790

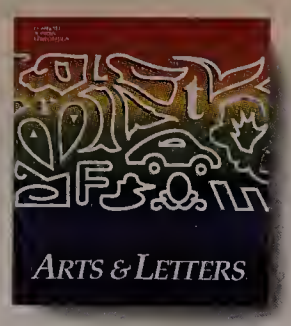
Touche 486/33 Model 5550T
PC Pros/Touche
8205 S. Cass Ave.
Darien, IL 60559
708/810-1010,
708-810-9490 (fax)
Reader service no. 791

USA Flex 486 33-MHz Cache System
USA Flex
471 Brighton Dr.
Bloomingdale, IL 60108
800/872-3539,
708/351-7204 (fax)
ACCESSORIES: 4MB RAM $200, 425MB IDE drive upgrade $324, 250MB tape backup $269, CD ROM $389
Reader service no. 792

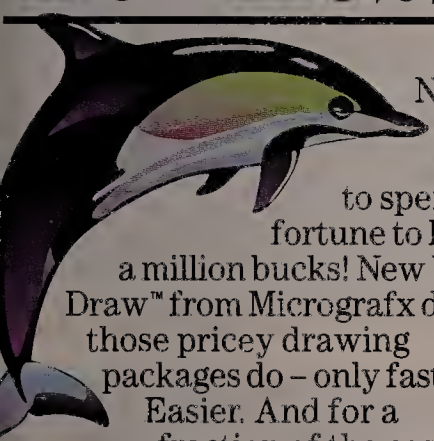
Wyse Decision 486/33
Wyse Technology
3471 N. First St.
San Jose, CA 95134
800/438-9973,
408/473-1972 (fax)
ACCESSORIES: 4MB RAM $559, floppy drive $150
Reader service no. 793

Zeos 486DX-33
Zeos Int'l
530 5th Ave. NW
St. Paul, MN 55112
800/423-5891,
612/633-1325 (fax)
ACCESSORIES: 50-MHz 486 DX2 upgrade $200, 50-MHz 486DX upgrade $400
Reader service no. 794





Do Everything Below For Less Than Any Of The Above.



Now you don't have to spend a fortune to look like a million bucks! New Windows Draw™ from Micrografx does what those pricey drawing packages do – only faster. Easier. And for a fraction of the cost!

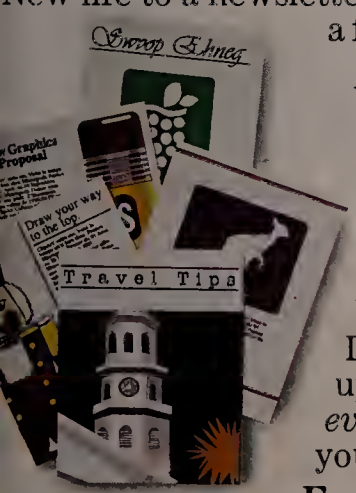
Create dazzling graphics with ease.

Graphics for the rest of us.

Already do your own graphics? Windows Draw will make it easier than ever. And if you don't, it's a great reason to start!

Windows Draw isn't for artists or computer wizards. It's for business people like you. People who want to add impact to a proposal. New life to a newsletter. Or flair to a flow chart.

In fact, because it's compatible with your favorite PC programs, you can use Windows Draw to dress up just about *everything* you do.



Add impact to proposals, reports and newsletters.

Easy does it.

With Windows Draw, easy-to-use drawing and color tools are right on the screen. Pull-down menus list an enticing selection of options available to you – including special effects like flip and blend. And "help" information is available at the touch of a button.

A way with words.

You can make your text look as good as your pictures, using Windows Draw in combination with PageMaker 4.0 or your favorite word processing package.

Do your own logos and letterhead designs.

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PC Magazine
12-31-91

"At $149, this program is a real steal."
InfoWorld
9-30-91

	Arts & Letters	Free-Hand	Harvard Draw	Corel	Windows Draw
Suggested retail price	$695	$595	$595	$695	$149
Gradients	Yes	Yes	Yes	Yes	Yes
Object blend	Yes	Yes	Yes	Yes	Yes
Bézier curve editing	Yes	Yes	Yes	Yes	Yes
Object rotation	Yes	Yes	Yes	Yes	Yes
Text on a curve	Yes	Yes	Yes	Yes	Yes
Outline fonts	Yes	Yes	Yes	Yes	Yes
Clip art	Yes	Yes	Yes	Yes	Yes
24-hr. tech support	No	No	No	No	Yes

Dress up your charts and graphs.

You can curve words, wrap them around pictures, shade them, color them, and much, much more!

A mammoth clip art library – free!

If you don't want to do your *own* drawings, you can choose from more than 2,600 ready-made images that come with Windows Draw. And you can modify and manipulate them the same way you do drawings made from scratch.

You'll never know how much you can do with Windows Draw until you try it. And with our money-back guarantee, what have you got to lose? Call to order today!

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REVIEWER'S NOTEBOOK: *The dizzying impact of sight, sound and motion is not easily forgotten. Our first experience with Multimedia CD-ROM felt like entering a new world — it grabbed our senses! If you make presentations or conduct training, adding sound and motion will yield incredible results: it's fun watching an audience with their mouths hanging open — completely entranced by what they're witnessing! This hot new technology enhances communication, there's nothing quite like FULL MOTION VIDEO. We've included 19 smash CD software hits to get you going — that's thousands of diskettes worth of information. These discs are packed with mesmerizing sound, magnificent animation and video, language lessons with spoken pronunciations, gripping games, color-drenched maps and plenty of information — with the added dimension of stereo sound. The world of Multimedia CD-ROM is here.*

Tiger has two complete multimedia packages to choose from. The first, features the CDR 37M, the ultralight, portable reader with zippy response times and rugged NEC quality. You also get the complete interface kit, including all the cables you'll need, a professional sound board, Microsoft's Windows extensions, a pair of high quality Persona Micro speakers (that pump out bonecrushing sound), and a special bonus that you'll only find in these bundle: It's called CD Speedway and it accelerates your CD-ROM drive up to 1000%! Some titles will run up to 7000% faster! The CDR 74M is the fastest reader in the world! Breathtaking 280 millisecond response speed and a brand new design incorporating state-of-the-art optical technology. Of course you get all the goodies: Full NEC interface kit, Giant Persona speakers, all the cables, industry-acclaimed MediaVision audio board, 19 CD ROM current-release titles, the sleek CD Caddy, stereo headphones and CD Speedway! Includes CD Version of Q & A — FREE!

The Value-packed CDR 37M package includes everything you see here. Includes high-quality Persona Micro Speakers for crisp, digital audio! Also includes new CD-Speedway — makes any CD-ROM reader up to 1000% faster!

THE CDR-37 MPC BUNDLE

The CDR 74M package is a monster — over $4800 in multimedia equipment — yours for just $1399!

Get everything you see! A complete multimedia video/audio setup — nothing else to buy! Plus 19 smash hit CD titles!

THE CDR-74 MPC BUNDLE

HERE'S EVERYTHING YOU GET

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CDR-37M CD-ROM Reader	$449.00
Complete Interface MPC Kit with Audio Board & CD-ROM SCSI Interface	428.00
Microsoft 3.1 Multimedia Extensions	79.95
Persona Micro Speakers	80.00
Multimedia World Atlas	149.00
U.S. Atlas & Automap	99.95
Reference Library	149.95
Time Compact Almanac	199.95
Toolworks Illustrated Encyclopedia	395.00
Guiness Book of World Records	79.95
Family Doctor	79.95
TigerSoftware Demos	99.95
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Multimedia Mavis Teaches Typing	99.95
Bible Library	595.00
Mammals	149.00
TimeTable Science & Innovation	99.95
U.S. History	395.00
Game Pack II (12 Smash Hit Games)	79.95
Wing Commander & Ultima VI	99.95
Monkey Island	79.95
CD Speedway	99.95
CD Launch & Play Menu Disk	99.95
Q&A	399.00
Total Value	**$4588.25**

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Complete Interface MPC Kit with Audio Board & CD-ROM SCSI Interface	428.00
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Persona Deluxe Speakers	229.00
Multimedia World Atlas	149.00
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Guinness Book of World Records	79.95
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TimeTable Science & Innovation	99.95
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Sherlock Holmes	69.95
Multimedia Chessmaster	99.95
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Loom	79.95
Monkey Island	79.95
CD Speedway	99.95
CD Launch & Play Menu Disk	99.95
Q&A	399.00
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The Database For People Who Actually Get Things Done.

ALL-NEW VERSION 2

Create Applications With Absolutely NO PROGRAMMING!

EVIEWER'S NOTEBOOK: *Alpha FOUR has brought the ouse down since its introduction, allowing anyone to create ustom applications for invoices, sales prospecting systems, ustomer lists and more. The reason is simple: Alpha FOUR equires NO programming. In just a few minutes, you can cre-te professional applications, customized to your specific eeds for more efficient management and analysis of your ata. And if you're a current Alpha FOUR user, you'll love he improvements and new functions — over 30 in all — that ave been made to this award-winning database package nd you can use your old Version 1 files in the .dbf format). f you're new to Alpha FOUR, you won't believe how easy it is o get the application you need — without the headaches. We ere impressed with Alpha FOUR's full networking capabili-ies, a powerful new scripting feature (practically does the ork for you!), new designer colors, faster indexes, crosstabs, he ability to utilize extended and expanded memory, built-in ata protection and password controls and the handy new tel-phone dialer. One of the most dramatic and important up-rade releases we've seen this year.*

Of course, Alpha FOUR is fully relational and completely enu-driven. Users simply outline their applications rather han programming them.

Alpha FOUR has gained quite a reputation for allowing users of any expertise level to design heir own applications — right out of the box. Now, he long awaited upgrade version is ready to ship — nd it will astound you with its new features — that still require no programming skills! Version 2 takes ase of use to a new level by allowing more productiv-ty with less work. One of the great new features is etwork support. Fully Novell and NetBios compati-le (including LANtastic, MainLan, LANManager, Banyan and others), Alpha FOUR Version 2 allows ou to actually create networkable applications by illing in one simple screen! All file and record locking rocedures are handled for you — automatically. And lthough many database products are networkable, nly Alpha FOUR Version 2 makes it so simple.

You'll find that new Alpha FOUR Version 2 re-quires dramatically less memory than the previous ersion, and far less than its competitors. And if you're using a memory manager, Version 2 makes ex-tensive use of extended and expanded memory for even faster performance. Even outrageously large ap-plications and databases — that you couldn't run be-fore — are no problem. Forget the "Out of Memory" message forever.

Indexes are an important aspect of the database. As you've probably discovered, indexes afford incredi-ble control over your data. Alpha FOUR Version 2 now gives you that control with up to 15 indexes per database! The Alpha engineers and programmers have come up with a way to make these indexes five times faster. For example, create three indexes on a last name for your prospecting database: one for STA-TUS, "Hot," one for STATUS, "Warm", and a third for STATUS, "Cold". Then, when you switch your active index AlphaFOUR instantly displays only the appropriate records.

Scripting Feature for More Professional Applications! Alpha FOUR Version 2's unique new PowerScripts give you the power to produce applications with a level of refinement previously achieved only by writ-ing code in a programmable DBMS.

You can use scripts for basic operations, like auto-mating a complicated series of keystrokes. Or, you can tap the true magic of PowerScripts and build cus-tom user interfaces. You can even add new features and functionality to your applications.

There are two kinds of Alpha FOUR scripts. Key-stroke scripts simply play back a series of keystrokes or script commands, or call another script. Dialog

Scripts allow you to display information in on-screen pop-up boxes and prompt the user to enter data or choose from a list of options. You decide when and where a dialog box will appear and what choices are presented to the user. You can even control the size, color and shape of your dialog boxes... all with-out typing a single line of code.

Analyze Your Data Any Way You Like! Alpha FOUR Ver-sion 2 has a great new crosstab feature that lets you summarize data on two dimensions. For example, suppose your sales database includes separate fields for product, state, quantity and sales person. Set up a crosstab to summarize the quantity field by sales per-son and product. You can see the total quantity of each product sold by sales person.

Then, with another few keystrokes, you can see the quantity sold of each product by state. This great new feature helps you analyze data and gain new in-sights to run your business more efficiently.

Desktops Keep Your Most Frequently Used Databases at Your Fingertips! With Alpha FOUR Version 2 you can define multiple desktops of open databases. You can pop-up a list of the databases in your desktop with a single keystroke, then switch between files in-stantly. No more returning to the main menu. For ex-ample, you could create an Orders desktop and switch easily between your Customer, Inventory, and Invoice databases all without leaving View mode.

Protect Your Data from Unauthorized Users! Now, you can assign passwords to: databases, applications, forms, reports, mail labels, browse tables, field rules, and global updates. You'll never have to worry about other users changing your critical database applica-tions, because now you control exactly who has ac-cess to what!

Phone Dialer for Fast Accurate Phone Contacts! Alpha FOUR's automatic telephone dialer lets you use your modem to automatically dial any phone number in your database.

New Designer Colors for Stunning Screens! Choose your own colors from a 64,000-color VGA palette, or use Version 2's built-in library of designer color schemes.

DOS Access! From anywhere in Alpha FOUR, just press Alt F9 to access DOS. Run any DOS program or issue any DOS command. Type "EXIT" when you're through and return to the same spot in Alpha FOUR.

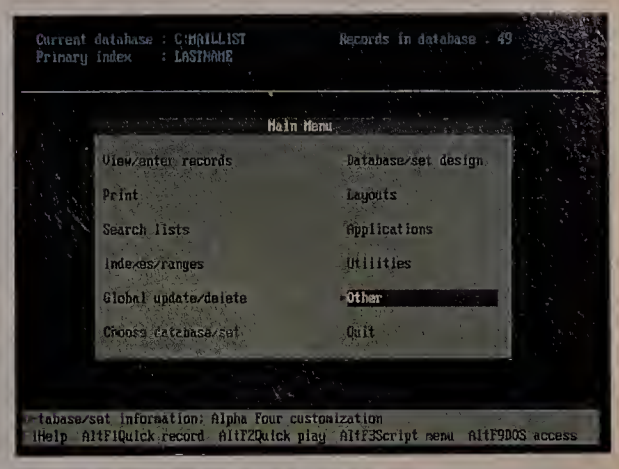
New Functions! Version 2 has over 30 new functions bringing the number of available functions to over 80. There's now virtually no limit to the variety of calculations you can perform with Alpha FOUR Version 2.

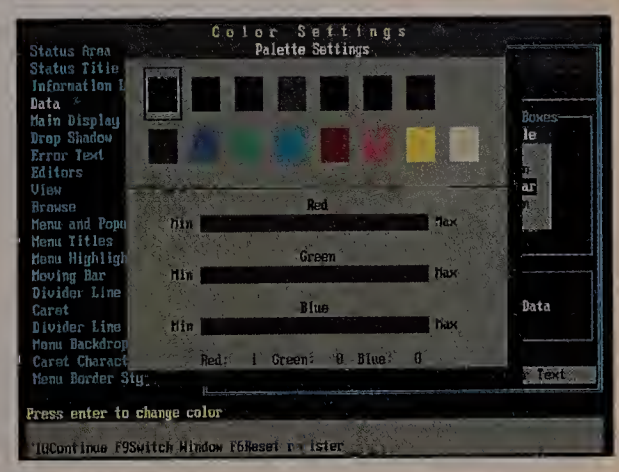
Postscript Printer Support for Easy Output! Now you can print Alpha Four reports, forms, letters, and browse tables in Courier font on any Postscript printer.

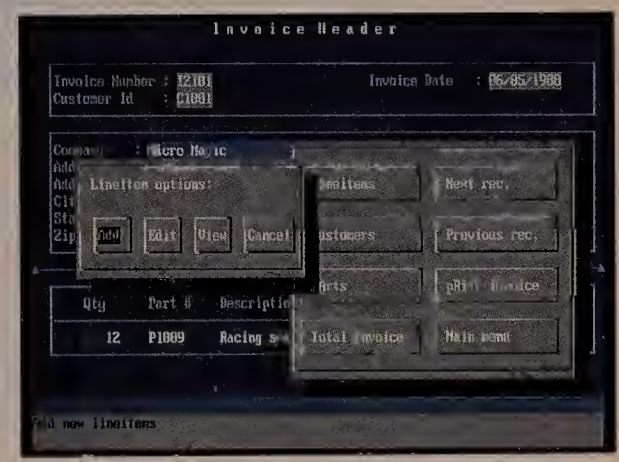
Append Commands! You get powerful new flexibility when you append databases together.

30 New Functions to Give Your Expressions Added Power and Flexibility.

1. New time functions make time calculations sim-ple. For example, calculate the number of seconds between two time values.
2. Even more powerful String Commands make string calculations easier. For example, split a full name into separate first name/last name fields.
3. New Trigonometric functions.
4. Financial functions like Present Value, Future Value and Net Present Value.
5. A powerful SOUNDEX function lets you search for records even when you don't know the spelling.







COMPETITIVE UPGRADE $99!

$99.00 upgrade is **not** *networkable.*

NOW AVAILABLE...

Alpha FOUR Network Version

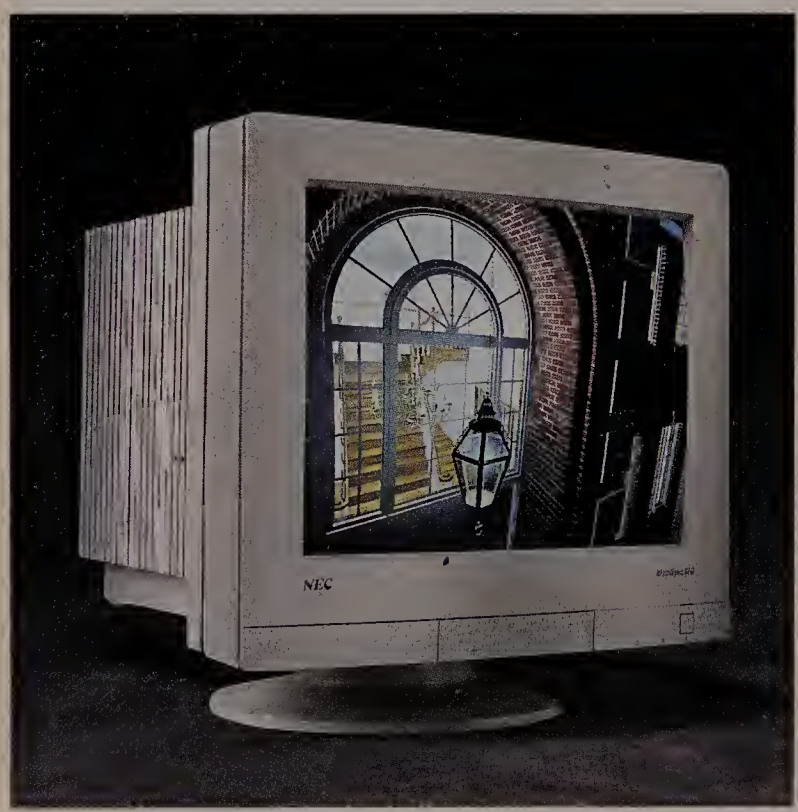
...And Tiger introduces this new network product with an exceptional offer: Buy the network server for $150, and get 2 stations for just $99 each! This is a bundle and must be purchased together.

Alpha FOUR Version 2

BBR3456A	**Alpha FOUR Version 2 Non-Networkable** Competitive Upgrade 3½"	**$99.00**
BBR3456B	**Alpha FOUR Version 2 Non-Networkable** Competitive Upgrade 5¼"	**$99.00**
BBR3457	**Alpha FOUR Version 2 Network Pack** Includes Network Server and 2 Network Workstations	**$348.00**

Thunderous Color Display!

REVIEWER'S NOTEBOOK: *The advanced new line of NEC monitors is designed specifically for PC users. They are magnificent, introducing flat-square screen, razor sharp resolution and rich color to the world. Faster, brighter screens are a must — without loss of focus. These features are available today from the NEC team of display researchers. The FG Series of monitors are packed with features, enclosed in a sleek cabinet that actually gives you more image area than conventional monitors. Each pixel is defined with unmatched clarity and saturated with color. No wash-out, no blur. The amazing new 4FG provides microprocessor-controlled, digital color. The on-board AccuColor system allows you to match PANTONE and Trumatch colors on screen! The Invar Shadow Mask allows a 20% brighter picture with no loss of clarity or contrast. And NEC's non-interlaced refresh technology allows flicker-free images.*



An affordable technological leap? The NEC FG displays are actually less than any of the other pricey nameplates, and deliver more quality, advanced design and performance. How can you possibly beat that? Destined to become "Product of the Year."

The NEC MultiSync 3FGx.

The designers and engineers went crazy on this one, packing unparalleled features and performance into this amazing new monitor. Like the new NEC FullScan capabilities and larger screen sizes, where you can see up to 36% more active screen display — without distortion. Its 15" screen is flat, and provides a high refresh rate. That means crisper images, brighter colors, richer tones and more contrast. You'll notice the difference immediately when looking at your desktop! In fact, the 3FGx has been fine tuned for flicker-free images demanded by end users. The

new flat-square screen design also enhances the display of single-pixel fonts on your PC, so even you type will look better.

The NEC MultiSync 4FG.

The 4FG revolutionizes monitors in one very important area: color accuracy. This new standard i video excellence is based on the concept of multiple frequency engineering. And only NEC can do it.

FREE SPEAKERS WITH THE NEC 5FG AND 6FG

NEC MONITORS

BBR2708	**NEC MultiSync 2A** 13"	**$395.00**
BBR2709	**NEC MultiSync 3FGx** 15"	**$660.00**
BBR2710	**NEC MultiSync 4FG** 15"	**$780.00**
BBR8516	**NEC MultiSync 5FG** 17"	**$1489.00**
BBR8517	**NEC MultiSync 6FG** 21"	**$3109.00**
BBR8530D	**NEC Monitor Lens** For 3FGx/4FG	**$69.95**
BBR8530F	**NEC Monitor Lens** For 5FG	**$189.00**
BBR8530G	**NEC Monitor Lens** For 6FG	**$189.00**
BBR2715	**Mac FG 8x Color Display Card**	**$799.00**
BBR2716	**Mac FG 24x Color Display Card**	**$1599.00**

While supplies last.

Sorry, no returns on these items. Shipping charges billed actual cost

The Incredible NEC Silentwriter 95

Microfine Toner Gives The Blackest Images!

The NEC Silentwriter 95 PostScript Power Made Perfect!

The laser-printed page just got a new standard: The NEC Silentwriter Model 95. The new Silentwriter 95 features advanced Sharp Edge technology for exceptionally smooth type, without jagged edges. The secret is in the Microfine toner, that can be evenly spread across the entire image or text character. Microfine toner means consistent, pro-quality results for every page.

It's a speedster — the advanced controller benchmark tests at 68000 @ 16.7 MHz — delivering 6 pages per minute with full support for PostScript Level 2 and Hewlett-Packard LaserJet III. Supports parallel, serial and Appletalk — with on-board intelligent switching. There's 2Mb of memory, expandable to 5Mb, 35 built-in Adobe fonts and 14 bitmapped and 8 scalable HP fonts. The Silentwriter includes 2 HP-compatible font slots for additional cartridges.

The Silentwriter 95 is PostScript Level 2, with full HP III (PCL 5) emulation. Imagine, you can print PostScript and PCL — the Silentwriter 95 automatically switches emulations for you. One printer can handle your PCs and Macs. You can coexist without scrambling over the printer or changing cables. It's called Automatic Interface Monitoring, and it prints a job regardless of which port its sent on. It's all here, built right in to the Silentwriter 95.

We weren't able to find this combination of features anywhere else at any price. Full-featured PostScript laser technology at an affordable price! And there's nothing like Postscript quality output. The print quality is absolutely perfect. Documents look typeset with the Silentwriter's Sharp Edge technology and Microfine toner. Now there's no reason to buy an off-brand printer. NEC is a name you know. The Silentwriter is a great-looking machine as well. Clean, striking design with solid performance.

"I want a printer that conveniently handles paper trays."

Only the Silentwriter 95 features an internal paper storage and delivery system. It's a snap to change paper, and it all fits inside one of the smallest footprints in the business.

The NEC Silentwriter 95 gives you advanced technology, quality materials and skilled workmanship at a lower cost! NEC means top value.

Print Explosive Color Pages!

The NEC Colormate PS

It's color PostScript at its best. You will never be satisfied with anything less after you print your firs full-color page. Your competitor's presentation wil pale by comparison next to your color work. Fast timely color sellsheets and promotional material can be produced in just a few minutes with a Colormate PS. Rich, vibrant color, approved by Pantone. I you use a Pantone licensed product such as Core DRAW! or PageMaker, you can produce the highes quality simulations for color matching applications It's a snap to install, simple and reliable to use — even replacing the four-color ribbons takes just a few seconds. Just pop-in a disposable cartridge. A built-in library of 17 Adobe fonts provides plenty of on-line type variety. The Colormate PS is built with the quality all NEC products are known for The highly reliable thermal transfer printhead contains no moving parts. Its compact footprint helps it fit into almost any workspace

Includes 2 Free Color Toner Cartridges! Enjoy months of color printing.

NEC PRINTERS

BBR8522	**NEC Silentwriter Model 95**	**$1545.00**
BBR8525A	**NEC Colormate PS Model 40**	**$4295.00**

Sorry, no returns on these items. Shipping charges billed actual cost.

LOGITECH MICE

REVIEWER'S NOTEBOOK: *Here's the entire line of precision-crafted, meticulously engineered Logitech mice. Along with their cousins, the Logitech 256 grayscale scanner and the amazing FotoMan, these award-winning pointing devices cover every need. Our favorite is the sleek new Trackman, perfectly contoured to the human hand, enables you to work quickly, with streamline "glide-and-click" action. Great for desktop publishing and word processing — try it once and you'll never be able to use an ordinary mouse again.*

The advanced new Logitech 256 ScanMan remains the finest hand scanner you can buy. With its new "virtual page scanning" technology, you can scan a larger image than using a full-page scanner! And only the ScanMan delivers full 256 grayscale images, rich with brilliant detail. Nothing else comes close. Excellent instrument for graphic designers.

The Logitech FotoMan has become one of our biggest sellers, bringing digital photography to the PC desktop. Throw FotoMan into your briefcase and take pictures on the road — and instantly download them from the camera directly to your PC.

TrackMan

The TrackMan Stationary Mouse gives you the precision of a mouse, but stays still on your desk. Logitech, the world's leading mouse experts, designed TrackMan so your fingers rest comfortably on the buttons and your thumb easily controls the ball. This advanced design features an ergonomic shape which is angles to fit your hand for hours of extra comfort and productivity.

TrackMan Portable

$15 MANUFACTURER REBATE!

Whether you're on the road or in the office, TrackMan Portable puts Logitech power and convenience in a format that's ideal for portable systems.

- Attaches to either side of a portable keyboard, so it requires no deskspace
- Small, lightweight and easy to handle
- Easily adjusted for comfortable use with either right or left hand
- Also comfortable and easy to use with your desktop system. Just plug in the 5-foot cable extension and start working.

MouseMan

$10 MANUFACTURER REBATE!

MouseMan is not just another mouse. Designed with nearly a decade of mouse experience and the feedback of ten million users worldwide, Logitech's MouseMan is the next step in mouse evolution. Specifically tailored for you, in right-and left-handed versions, MouseMan provides maximum comfort, reliability and power.

Make Friends With Kidz Mouse!

Fun and smart, Kidz Mouse puts children in touch with their computer so they can learn educational programs, do their homework and play games. Kidz Mouse is a perfect fit for small hands, because it's designed specifically for children. Clicking the mouse button "ears" opens up a whole new world of computing for them.

The Cordless Mouse

$15 MANUFACTURER REBATE!

The only problem with this new innovation from Logitech is that you'll have to get used to NOT POINTING IT AT YOUR MONITOR! The MouseMan is a cordless, three-button, radio-controlled mouse! No cables, no line-of-sight positioning! The radio receiver can be placed anywhere — even under your desk — and still allows you to work with precise movement. It's fully Microsoft compatible and includes Mouse-2-3, designed for maximum Lotus 1-2-3 productivity.

LOGITECH MICE

BBR2538	**TrackMan Combo**	**$89.00**
BBR2591	**TrackMan Portable**	**$99.00**
BBR2200	**MouseMan MAC**	**$89.00**
BBR2595	**MouseMan (Cordless Mouse)**	**$99.00**
BBR2596	**MouseMan for Serial & PS/2**	**$69.00**
BBR2589	**Kidz Mouse**	**$49.00**

Rebate Offers End June 30, 1992. Call for details.

INSTANT DIGITAL SNAPSHOTS!

Introducing The Incredible New Logitech FotoMan...

REVIEWER'S NOTEBOOK: *What is it? In short, it's a portable, digital camera — for your computer. FotoMan takes great pictures with amazing clarity and 256 grayscale richness — then allows you to instantly download them to your PC. It includes a slew of image editing tools that open a world of creative opportunity, and is compatible with virtually all desktop publishing programs. The applications for this new technology are enormous. Insurance and real estate professionals are using it to expedite claims and transmit photographs of neighborhoods and homes. Manufacturers use FotoMan to quickly catalog products and parts, while law enforcement officials are using it to photograph suspects, crime scenes and evidence — without the time and expense of film.*

There are hundreds of practical uses for this new product, but we found FotoMan was also a lot of fun. It comes with an automatic flash, one-button operation and a field of focus from three feet to infinity. FotoTouch provides a sophisticated range of features including 256 grayscale editing. It's one of the hottest new ideas in computing: the digital photograph — taken by a small, portable and easy-to-use camera that allows instant transfer to your computer — without a digitizing board or other hardware.

In the past, getting a photograph into your PC meant using a traditional film method. The film would first be processed into either slides or prints, then scanned or stripped into your document. Now just snap a photo of a new employee, for example, and send it directly to the corporate database. Once the images are downloaded, FotoTouch shows you miniature versions so you can choose the image you want. When you've got your shot on-screen, the FotoTouch software allows you to easily make modifications. Then save your image in either TIFF, CCIT, BMP, PCX or EPS format. There's no film, no developing and no waiting!

LOGITECH FOTOMAN

BBR2592	**FotoMan**	**$599.00**

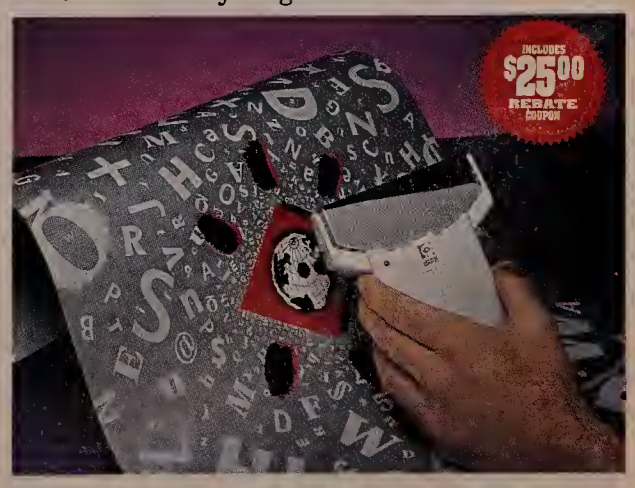
Call for requirements.

Merges Multiple Scans Together–Seamlessly!

When we first introduced the ScanMan Model 256 Grayscale hand scanner last year, it met with a roar of enthusiasm. We published the results of our testing — unbelievably sharp scans, with crisp, rich detail and 256 levels of gray. Scanning photos, illustrations — and text — was instantly taken to a new level. In head to head testing, we found the Logitech ScanMan Model 256 to be more versatile, faster and capable of producing large crystal-clear images. The 256 levels of gray add more depth and realism to all your scanned images. Logitech had created the ultimate hand scanner, the hottest new product of the year.

But when you work with Logitech, you come to understand that they never sit still. While the ScanMan Model 256 was sweeping the industry (*PC Magazine's* "Editor's Choice," *InfoWorld's* 1991 "Product of the Year," *PC Computing's* "Most Valuable Product of 1991"), they were at work designing an enhancement that would catapult it to another level entirely — a completely new category of scanners. The innovation: Virtual Page Scanning. The Technology: the Logitech Autostitching feature. It automatically "stitches" 2, 3, — even 4 scans together (so it can handle more area than an 8.5 by 11 flatbed scanner!). No other scanner we've ever seen can automatically merge scans into one completely seamless image. The ScanMan Model 256 smooths and de-skews the stitch, while evening the tones across the scans for remarkable images.

ScanMan Model 256 comes with Perceive Personal, one of the industry's highest-rated OCR software.



$25 MANUFACTURER REBATE!

Rebate coupon included in box.
Offer expires June 30, 1992.

LOGITECH SCANMAN

BBR2593	**ScanMan Model 256 with Perceive**	**$299.00**

Please call for system requirements.

Order Hotline **1-800-888-4437**: M-F 8am-10pm
Sat. 8:30am-8:00pm & Sun. 11am-5pm (EST)

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Here's what you get: Microsoft Windows 3.1; the all-new Lotus 1-2-3 for Windows 1.1; the all-new Ami Pro 2.0 from Lotus; WIND•EASE, the concise Windows tutorial program; 3-D Charts To Go!, the fast, easy three-dimensional charting program; RightWriter for Windows style and grammar checker; and a Logitech mouse. We call it "The Impossible Bundle" because it would be impossible for anyone else to put together these programs for this price! Keep reading, because this is an offer you simply can't pass up!

Lotus 1-2-3 For Windows 1.1 Spreadsheet Power

The Impossible Bundle begins with Lotus 1-2-3 for Windows Competitive Upgrade, the new release that brings the magic of the 1-2-3 spreadsheet to the GUI. There's a world of brilliant new features packed into this new release — like Lotus' unique SmartIcons, offering one-click access to tasks and commands. Just click on one and save dozens of keystrokes. Cut, paste, save, print, format and more with just one move. Like macros, SmartIcons can save hours of manual input as you prepare your spreadsheets.

There's more power, too. Like true 3-D spreadsheet capabilities, Solver, BackSolver — and with one click, you can bring up 1-2-3's familiar "Classic" menu and run 1-2-3 for Windows from the old reliable command bar, just for old times sake. It's the perfect start to the perfect Windows Bundle.

This is a competitive upgrade package and certain restrictions apply. Call us for details.

Ami Pro, The Ultimate Word Processor For Windows

You also get Ami Pro 2.0 Competitive Upgrade — just released — the perfect combination of Windows ease and beauty with raw word processing power. Ami Pro 2.0 never had a DOS version, it's pure Windows, with more publishing power than Word for Windows or WordPerfect 5.1. It handles fonts, line spacing and text like a high-end typesetting system (but much easier). It contains the same SmartIcons found in 1-2-3 for Windows, giving you one-click shortcuts for virtually anything you do.

Ami Pro 2.0 features fast outlining, easy revision marking, mathematical equations and even freehand drawing. You'll put together charts and tables with simple point-and-shoot action. You'll see your work with true WYSIWYG display.

Have you always found mixing text and graphics difficult? Who hasn't? But you'll actually have fun doing it with Ami Pro 2.0. Today, with most businesspeople drowning in paper, your documents need the snap that graphics provide. Using Ami Pro 2.0, you'll create spectacular newsletters, reports, proposals, presentations and more. In fact, just about anything you put on paper will look better, take less time and project pure professionalism every time.

This is a competitive upgrade package and certain restrictions apply. Call us for details.

Microsoft Windows & Logitech Series 14 Mouse

The Impossible Bundle continues with Windows 3.1 and the Logitech Series 14 Mouse, packaged together and ready to install. If you haven't seen Windows 3.1 — what are you waiting for? Step into the future with the vivid brilliance of the Graphical User Interface. And of course, with Windows comes the ability to just click-to-open applications. That's what the Graphical User Interface is all about.

WIND•EASE, The Ultimate Windows Tutorial Program.

Once you've become a Windows user, you'll want to explore the system and use it to its fullest. That's what WIND•EASE is all about: helping you get the most from the Windows operating system. Its "visualization" method of teaching lets you move quickly through all aspects of the interface and functionality, faster than simply reading the manual. In fact, you can simply throw the Windows manual away! With WIND•EASE, everything you need to know is just a click away.

WIND•EASE is a rich graphical program with *18 distinct program segments*, designed to isolate and teach you Windows concepts. WIND•EASE also includes a question and answer exercise at the end of each segment, designed to reinforce, clarify and offer additional insights into the material presented.

3-D Charts To Go!

The Impossible Bundle also includes 3-D Charts To Go!, the world's fastest, easiest — and most powerful three-dimensional charting program. Just type in the numbers and this popular system automatically creates colorful 3-D bar charts, line charts, area charts and pie charts.

Change a number and the chart is instantly redrawn to reflect the change. You also have complete control over the viewing angle of your charts: rotate them for the most dramatic perspective.

A perfect addition to Lotus 1-2-3 for Windows. You can also use 3-D Chart To Go! to create eye-grabbing presentations and slide shows, using its library of background colors and patterns, as well as its collection of professional-quality clip-art.

RightWriter for Windows Style and Grammar Checker

New RightWriter for Windows brings the most highly respected style and grammar checker to the graphical user environment. Now, your Ami Pro documents can be clean and error-free — in seconds!

RightWriter for Windows is a powerful expert system that applies more than 6,500 rules of good writing to your documents. With just a few clicks of your mouse, RightWriter checks your word processing documents for thousands of potential writing errors — in grammar, style, word usage, punctuation and more!

RightWriter also rates your documents for readability and strength. These summary indexes help you target your writing to specific audiences. The result is powerful, effective writing.

Here's What You Get:

1-2-3 Windows	reg. price	$99.00
Ami Pro 2.0	reg. price	$99.00
Logitech Mouse	reg. price	$99.95
MS Windows 3.1	reg. price	$149.95
3-D Chart To Go!	reg. price	$99.95
WIND•EASE	reg. price	$59.95
RightWriter Windows	reg. price	$99.00
Total regular price		$706.80

IMPOSSIBLE BUNDLE PRICE $299!

THE IMPOSSIBLE BUNDLE

BBR5199C **The Impossible Bundle** 3½" . . . **$299.00**
BBR5199D **The Impossible Bundle** 5¼" . . . **$299.00**

Because you get so much stuff, we must add $9.95 shipping on this bundle.

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Freelance For DOS Upgrades: $99 Freelance Windows: $99

The Incredibly Nimble Presentation Products: Vivid Type, Charts, And Graphics.

FREELANCE DOS

When you're ready to put together the presentation of your career, complete with slides, overheads and handouts that bring the house down, seek the help of the hottest business graphics program available for DOS — Freelance Graphics. Now in its fourth successful release, Freelance Graphics has won every major industry honor, from major publications like PC Week, PC World, Publish! and Software Digest. It's no surprise to Freelance users, except — they sort of wanted to keep Freelance a secret.

Freelance Graphics offers a magnificent array of tools and unique "Smart Features" that represent the best way to assemble a "knock their socks off" presentation. It comes complete with 55 pre-designed chart templates, 13 ready-to-run chart types (including bar, pie, text, line, x-y scatter and more) and a gallery of over 1000 top-quality symbols and graphics for use in your presentations. You can also create your own graphics or scan in logos, graphics and designs.

If you like, you can run your presentation right on your PC with Freelance Graphics' Screen Show — and include a host of great special effects such as fades, wipes, dissolves and more. You'll get your message across with a powerful presentation.

Fully featured for charting ease. Includes every chart type you could ever want. Linked to data files, charts are always up to date — automatically.

Start with Portfolio.

Portfolio is a built-in presentation manager that makes planning your presentation fast and easy. It's your right hand man as you outline, organize and print your materials. Portfolio contains 90 professionally designed backgrounds — just select the one that's most appropriate for your presentation, then start adding text and charts. It's the automatic way to give your slides and overheads a consistent, pro-quality look.

If you decide that your background is too dark, or your logo is too small, Portfolio allows you to make global changes in your slides, overheads and handouts with just a mouse click. If you like, you can automatically print your drawings in a Portfolio list and export them to CGM files.

Portfolio acts as your art director for your presentations. As the creative director, you decide how you want your materials to look and Portfolio looks after the details.

Freelance Graphics includes a custom-designed companion outliner, GrandView LT (designed specially for Freelance by Symantec). Simply type your text into the sleek outline format and Freelance automatically creates a series of perfectly formatted word charts (and creates a Portfolio file as well). So, using Outliner, you could whip up a presentation in as much time as it takes for you to type in your thoughts! And Outliner contains a spell checker to ensure error-free text.

FREELANCE WINDOWS

The Premier Presentation Product On The Windows Platform.

For Windows users, the power and beauty of Freelance Graphics explodes with an incredible assortment of graphics tools based on the DOS version, but taken to a new level of visual excitement and functionality.

Unlike Freelance Graphics for DOS, Freelance Graphics for Windows contains an innovative set of features known as SmartMasters. These "presentation templates" allow you to choose from dozens of professionally designed formats for title pages, bulleted items, graphs, charts and text placement. Using these advanced templates is easy; just pick the one you like the best for your presentation's page layout, provide Freelance with the content and the rest is virtually done for you!

SmartMasters are grouped in sets that contain a handsome variety of pro-quality formats with similar graphic styles. There are over 60 SmartMaster sets, each providing different colors and styles to capture any feeling you want to project. Choose from bright, vibrant colors, pastel tones, deep colors and a variety of interesting background patterns, shapes and graded tones. The SmartMaster concept delivers stylistically consistent, professional quality presentations every time — with minimal effort. You spend your time concentrating on your presentation's message; Freelance gives it impact. And since SmartMaster sets contain the same formats, you can actually switch sets, to change the entire look of your presentation automatically, without tedious clean-up. You can use SmartMaster or customize them.

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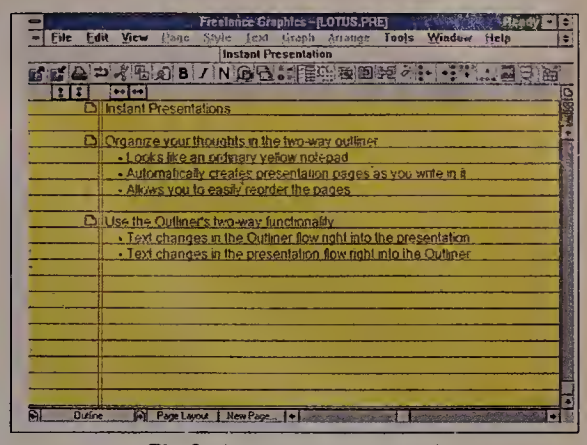
LOTUS SMART PICS SAMPLER

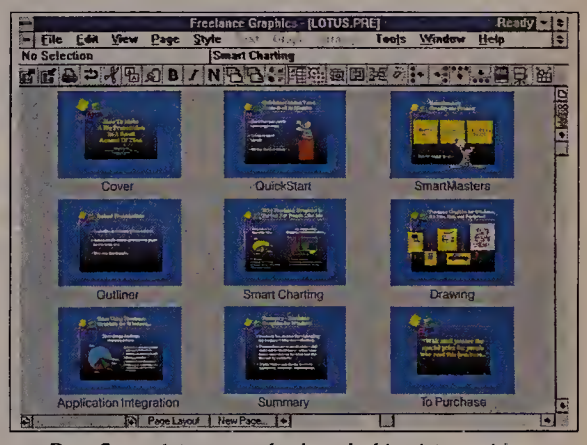
The Ultimate Clip Art Library
Megabytes of High-Quality Art

QuickStart lets you become a know-it-all in minutes. Just click to choose your background.

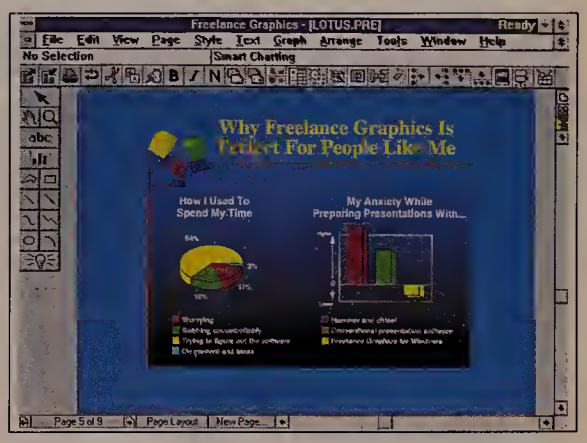
SmartMasters let you start out further along than most people finish.



The Outliner puts you in control. Organize your thoughts before you begin...



Page Sorter lets you get back to the big picture with an overview of your individual pages. You'll know where you are all the time...



Smart Charting means impressive graphs — instantly. Change chart styles for maximum impact!

FREELANCE VERSIONS

BBR5173 **Freelance DOS 4.0**	**$355.00**
BBR5174 **Freelance Windows**	**$355.00**
COMPETITIVE UPGRADES	
BBR5196 **Freelance DOS 4.0 Upgrade**	**$99.00**
BBR5198 **Freelance Windows Upgrade**	**$99.00**

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Instantly Turn Your PC into a Fax Machine!

REVIEWER'S NOTEBOOK: *Your PC is the perfect fax machine: it easily creates documents to fax, it has powerful printing capabilities and contains plenty of storage space. It allows you to automatically transmit faxes at a certain time. You can send crisp, clean facsimile documents right from your desktop or laptop PC. With Faxography, included free with all Fax96 products, you can fax documents with 648 different fonts, graphics, special effects and more. Fax96 automatically previews the document on the screen so that you are faxing the file just as you would print it. Of course, using your PC makes it much easier to manage and archive your faxed communications. And, using your laser or dot-matrix printer, you can receive faxes ON PLAIN PAPER. All you need is the compact, affordable little board you see here, known as Fax96.*

Tiger presents the price-busting fax board that has swept the industry, and captured *PC MAGAZINE's* "Editor's Choice" with its flawless reliability record. No other fax board can match Fax96's incredible 99.91% error-free transmission rating. In speed tests, using identical documents, Fax96 delivered a finished facsimile over fourteen seconds ahead of the nearest finisher.

Why should you buy Fax96 instead of a dedicated fax machine? Fax96 is faster, because it doesn't have to scan documents before transmitting. Fax96 is much, much less expensive. Why should you pay for an extra printer (built into a fax machine), when you already have a printer attached to your computer? And no stand-alone fax machine can match the high quality. Fax96's concept of "scanless" document imaging eliminates dust, dirt and transmission "noise" that shows up as dots, lines and patterns on the finished fax. A fast, streamlined interface makes Fax96 a snap to learn and use.

New! The Fax Window.

Now you can fax from Windows as easily as you print! Create fantastic faxes in Word for Windows, Ami Pro, even Corel Draw — then print to the Fax Window instead of your usual printer. Fax Window runs totally in the background, taking full advantage of Windows' multi-tasking capabilities.

New! Lightning-Fast Modems! 9600 & 14,400 Winfast Series

Introducing the highest speed modem available — 14,400 bits per second. Wow! They don't get any faster than this. At 14,400 bits per second, your data transfers zing with the speed of living lightning itself! The makers of Fax96 joined efforts with modem experts serving top-level banks around the world to bring you the absolute finest in fax/modems, the Winfast Series.

Reviewers Say Top Notch.

Fax96 is the product that John Dvorak "Highly recommended," *InfoWorld* said "worked perfectly," UPI gave an "unqualified recommendation" and that *PC Magazine, Teleconnect, Home Office Computing* and *Inbound/Outbound* magazines gave Editor's Choice, Four Star and Year's Best Product awards. Those awards came before Faxography, automatic fax preview and custom cover letters with your letterhead were added!

Call our Tiger Reps today to find out which fax/modem is the best for you.

INBOUND OUTBOUND EDITORS ★CHOICE★ — THE YEAR'S 8 PRODUCTS TO CREATE — PC MAGAZINE EDITOR'S CHOICE August 1990 FAX96

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WITH FAX 96: FaxMania from T/Maker AND LOGITECH'S MODERN ART "Business And Professional"

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Fax96 New Low Prices

BBR6240	**Fax96**	$99.95
BBR6270	**Fax96 with Modem**	$129.95
BBR6280	**Fax96 with Modem/Windows**	$149.95
BBR6250	**1-Liner**	$149.95
BBR6255	**1-Liner with Modem**	$189.95
BBR6256	**1-Liner with Modem/Windows**	$199.95
BBR6264	**Winfast 9600 Fax/Modem**	$399.00
BBR6262	**Winfast 14,400 Fax/Modem**	$499.00
BBR6263	**Winfast 9600 1-Liner**	$449.00
BBR6261	**Winfast 14,400 1-Liner**	$549.00

Requires IBM PC/XT/AT or compatible, 640K memory and hard disk.

Sorry, free shipping is not included.

Novell's Do-It-Yourself Network In A Box.

REVIEWER'S NOTEBOOK: *Everything you need is in one box — a sensational way to break into the productive world of peer-to-peer networking. Take any two computers — add NetWare Lite — and you can share files, applications, hard disks, peripherals and printers — all with the blistering speed of Ethernet. And NetWare Lite is simple to install, use and administrate. Smaller businesses can now enjoy the advantages of 100% Novell networking (and make no mistake, they're the industry leaders), without a dedicated server, extra RAM or any worries at all.*

Everything for simple, do-it-yourself installation is in the box: 2 Ethernet adapter boards, 2 NetWare Lite Software Nodes, a complete installation guide and Videotape, 2 T-connectors, 1 Terminator kit and a heavy duty 20-inch RG58A/U coaxial cable. All you need is a screwdriver and about fifteen minutes... just follow along the the videotape that comes with NetWare Lite...

And expanding NetWare Lite is easy: add a PC to your office and purchase another low-cost node. Buy just what you need when you need it. NetWare Lite will support up to 25 networked computers.

One note about speed and security: Novell's technology leads the industry in data transfer speed. The NetWare IPX network protocol is the fastest, most reliable in the business. Security is another Novell hallmark, featuring encrypted passwords, access restrictions and assigned privileges that keep curious eyes away from your critical files.

If you're thinking about networking, this is the product for you. It supports Windows and enables interoffice messaging. Top-quality, blazingly fast performance and backed by the most important name in networking.

NETWARE LITE

BBR3304	**Netware Lite**	$485.00
BBR3303	**Additional Nodes**	$279.00

IBM PC, XT, AT and compatible PCs, IBM PS/2, 25KB workstation PC RAM, 50KB server PC RAM, PC-DOS 3.x, MS-DOS 5.0, DR DOS 6.0.

How To Be Sure Your Computers Have The Latest Versions Of All Your Files!

REVIEWER'S NOTEBOOK: *If you work on more than one PC, and transfer files between them — you already know the problem: getting the latest version of your files on all the computers you use — and keeping them up-to-date. FileRunner is designed to automate and safeguard file transfers — and does NOT require any cables, modems or network hardware. The secret is on the diskette — and the proprietary Overwrite Safeguard technology. This advanced capability can detect when a critical file has been altered on one or more computers. When an altered file is spotted, FileRunner alerts you immediately. It automatically updates the older version and maintains identical files on all of your computers, "synchronizing" them, in effect.*

And FileRunner is very easy to use. No complex DOS commands, data compression programs, obscure path names or directory locations. FileRunner tracks all of this information for you and knows automatically where files are and how to find them.

FileRunner is a low cost alternative to setting up a network between two PCs — just move files quickly back and forth on diskette! All files will be the latest versions. If you are on a network, FileRunner provides a simple way to transfer files between networked PCs and standalone desktop PCs or notebooks. As a bonus,

FileRunner diskettes can act as a backup of critical files (since it's a diskette-based system). The diskette is always up-to-date.

FileRunner also contains a host of very sophisticated time features for keeping files updated. It automatically takes into account time zone differences for travel, calculates time loss, and prompts you to adjust inaccurate system clocks. It even recognizes and accounts for Daylight Savings Time.

This ingenious utility should be part of every business environment with multiple PCs.

FILERUNNER

BBR3297	**FileRunner** Dual	$99.95

Information & Orders: **1-800-888-4437** Int'l Orders: 305-443-8212 Fax: 305-529-2990 **FREE** FEDERAL EXPRESS **SHIPPING**

Circle 259 on reader service card

Create Realistic, 3-D Landscapes In Virtual Reality!

Or View The Heavens In An On-Screen, Digitized Planetarium!

REVIEWER'S NOTEBOOK: *Amazingly realistic electronic landscapes that put you on the edge of your seat. Using new VistaPro is like hiring a helicopter and flying over some of the world's most picturesque natural wonders: Mt. St. Helens — before and after the eruption, legendary Half Dome and El Capitan in Yosemite, Crater Lake in Oregon and the Cauldera area of Olympus Mons — Mars! You can create your own scenes from the billions of randomly generated fractal landscapes built-in — and adjust camera angle, focal length, lens power and more. Assemble animated sequences and incredible dreamscapes with VistaPro's powerful animation engine. The result is stunningly realistic images that can move you right into the landscape.*

We were also impressed with VistaPro's sister product, Distant Suns. This is a fascinating astronomical playground for students, amateur astronomers and curious spectators. It displays the night sky with precise accuracy for any part of the world, including 9100 stars, 450 galaxies, nebulas and star clusters. Add up to 3,000 custom objects to the sky. Click on any object and bring up detailed information, including your choice of over 200 photos.

Arthur C. Clark, author of 2001: A Space Odyssey says "I'm really boggled, it's beautiful, especially when all the lights are off. I'm totally awed by what you have done!"

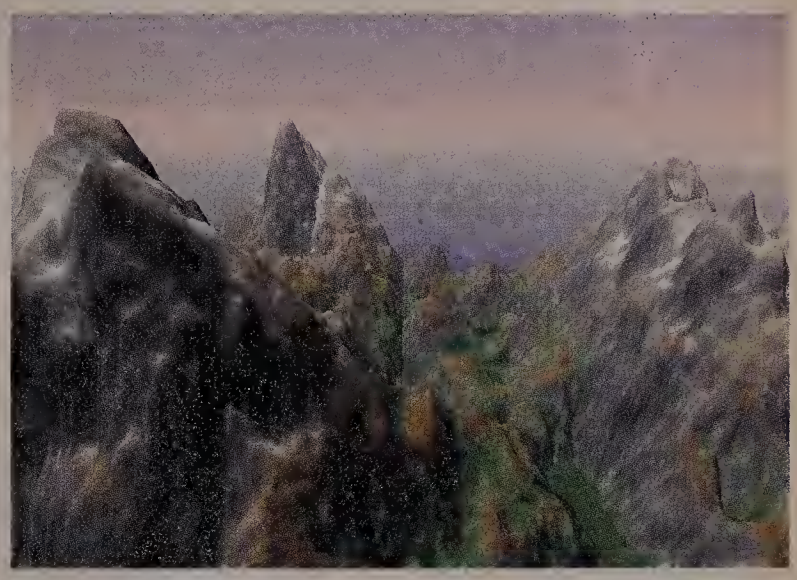
VistaPro.

Create 256-color images with high-quality resolution in true 3-D. Produce animated "flights" over custom landscapes, with several modes of coloring and shading and fractal image detail. Add trees and mountains, snow, waves, haze, rivers and cliffs. Zoom in, swoop in or swing out for a broader view. Allows you to paint your landscapes to produce thousands of possible effects. Light your scenes the way you want — daytime, midnight, sunrise or sunset, produce lifelike shadow detail and natural movement. You'll create images that trick your brain into thinking they're real! Also includes a special bonus program that creates landscapes from Mandlebrot, Julia and Lyapunov sets — bringing their wonderful work to 3-D life! Don't miss the animated flyby of Mars (and its version of the Grand Canyon)!

Vistapro is not only of interest to scientists and engineers. Artists, writers, teachers, game designers, travelers, and people just looking for hours of entertainment will appreciate Vistapro. Artists can design realistic scenery as backgrounds for their artwork. Writers can create worlds and see them through their characters' eyes. Geography, geology, and meteorology teachers can use Vistapro to breathe life into their subjects.

Distant Suns Windows.

A time machine and a telescope! Distant Suns Windows allows you to travel to any date and see the unique view of the sky. The changing phases of the Moon, the planets and the stars, the constellations and more. Travel 1,000 years back in time and observe the exact sky that inspired the ancient Anasazi astronomers.



The US government Geological Survey has mapped over 40% of the US, plus undersea and extra terrestrial landscapes, into computerized models. Vistapro lets you view, scientifically modify, and save these fascinating 3D images as .PCX files.

VIRTUAL REALITY LABS

BBR3283 **VistaPro**	**$89.95**
BBR3284 **Distant Suns**	**$59.95**
BBR3282-5 **Distant Suns & VistaPro Bundle** 5¼"	**Save $20**
BBR3282-3 **Distant Suns & VistaPro Bundle** 3½"	**Save $20**

VistaPro: *640k RAM w/540k free, hard disk w/5Mb free, VGA/SVGA graphics card (VESA driver), and driver.* ***Distant Suns:*** *Microsoft Windows, 286 or greater, EGA or VGA and hard drive.*

THE PC CHEMISTRY LAB!

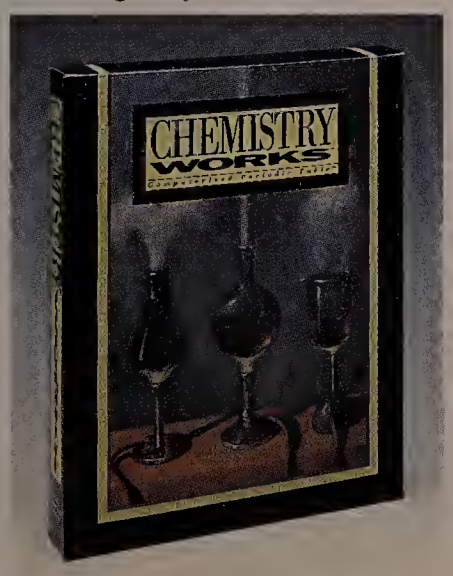
REVIEWER'S NOTEBOOK: *Just released! New CHEMISTRY WORKS provides detailed information on the Periodic Table of Elements. Discover secrets about the 108 elements that are the building blocks for everything around us. A fascinating educational and reference title, packed with information on atomic numbers, atomic radii, boiling points, crystal structures, fusion, oxidation, symbols, solid/liquid/gas, electrons, protons, ions, isotopes and thermal conductivity to name just a few.*

CHEMISTRY WORKS includes colorful, graphic screens illustrating atomic structures and element properties. Create reports in a snap for school, scientific presentations, technical documents and lab reports. Ideal resource for students, teachers, engineers, researchers and hobbyists. Perform fast searches, sorting and selection from a vast database. Another smash hit from the makers of AutoMap.

- Contains detailed information about each element, from atomic weight and covalent radius to melting and boiling points.
- View graphics of atomic structures and element properties.
- Use pull-down menus for quick searching, sorting and selecting from its vast database.
- A comprehensive resource for students, teachers, chemical engineers, and researchers.

Topics Include

Atomic numbers	Heat of fusion
Atomic radius	Heat of vaporation
Atomic volume	Melting point
Atomic weight	Oxidation states
Boiling point	Specific heat
Covalent radius	State — solid, gas, liquid
Crystal structures	Symbols
Density	...and more.
Electronegativity	



CHEMISTRY WORKS

BBR4102 **CHEMISTRY WORKS** Dual **$69.95**

Requires IBM PC or compatible, 640K RAM memory, PC/MS-DOS 3.3 or higher, minimum 1.5MB hard disk memory, VGA, EGA, CGA, or Hercules Graphics. Mouse optional.

THE LAST WORK OF ISSAC ASIMOV!

REVIEWER'S NOTEBOOK: *The recent death of Issac Asimov marks the passing of one of the world's most respected science fiction writers. His books and articles have been read by generations of sci-fi fans and printed in dozens of languages...*

Mr. Asimov left us with a computer masterpiece (his only project for the PC) that explores the mysteries of the physical world in breathtaking multimedia. Written entirely by Asimov, Science Adventure is more than a simple reference tool, more than pictures and words — it is a leap into another world. It doesn't just answer questions, it challenges you to think as you explore — and to ask new questions. Covers chemistry, physics, biology, astronomy, ecology and technology. You set the time in history and chart your own course to discovery, unearthing facts about the planets, diseases and cures, x-rays, chemical reactions that changed the world and the scientists who discovered them.

Great learning tool for students of all ages. The icons, illustrations and photographs and digital sound clips are engaging, so learning becomes fun. Contains hundreds of high-resolution, 256 color, SuperVGA-quality images and sounds (requiring just 7Mb of hard disk space through Science Adventure's innovative compression techniques), just click your mouse to set them loose...

We're saddened by the loss of Issac Asimov, a great American writer. But his legacy of imagination and knowledge lives on in Science Adventure.

Thank you, Mr. Asimov...

Do you know who discovered Pluto, or how a cure for polio was discovered? Who risked their neck to make the first hot-air balloon flight? How do cells divide? Who first circumnavigated the Earth? If you can imagine a question, Science Adventure can point you to the answer. Issac Asimov's brilliant panorama of scientific knowledge and adventure will fill your senses.

Also available from Tiger: Knowledge Adventure — a fascinating journey through time and achievements, and Sports Adventure — everything you always wanted to know about sports.

BUY ALL 3 AND SAVE $40

SCIENCE ADVENTURE

BBR4216 **Science Adventure**	**$79.95**
BBR4215 **Knowledge Adventure**	**$79.95**
BBR4214 **Sports Adventure**	**$79.95**

IBM or Tandy compatible PC, hard disk and EGA or VGA monitor. Mouse recommended.

DR DOS VERSION 6 VS MS-DOS VERSION 5

DR DOS DOMINATES!

REVIEWER'S NOTEBOOK: *If you want to run your DOS, Windows and networking applications faster and easier, while maximizing your hard disk's performance, Digital Research has the answer: DR DOS 6.0. InfoWorld awarded DR DOS 6.0 its Buyer's Assurance Seal, eclipsing MS-DOS 5.0 and virtually running away with the scoring. High marks everywhere for this software masterpiece, particular superiority in disk management, task switching and Windows support.*

The new MemoryMAX feature moves DR DOS, buffers, drivers, TSRs and network software outside your 640K, leaving DOS, network and Windows plenty of elbow room. The more powerful your machine, the more memory you'll reclaim. For us, this was the most compelling feature. We also applaud DiskMAX, a collection of unmatched disk utilities: disk optimization, compression and state-of-the-art disk caching. All integrated, all ready to use. TaskMAX, another advanced feature, allows you to load up to 20 applications at a time — then switch from one to another instantly. Cut and paste between these applications. TaskMAX automatically switches to extended or expanded memory; switching between programs is instantaneous. Extensive testing proves that DR DOS 6.0 clearly outperforms MS-DOS 5. It's the disk operating system that Microsoft doesn't want you to know about...

DR DOS 6.0 is DOS without the drawbacks, designed specifically to overcome the flaws that MS-DOS users have complained about from the beginning. And while MS-DOS 5 has come a long way, it's still not as fast, as easy or as rich in useful features as DR DOS.

DR DOS 6.0

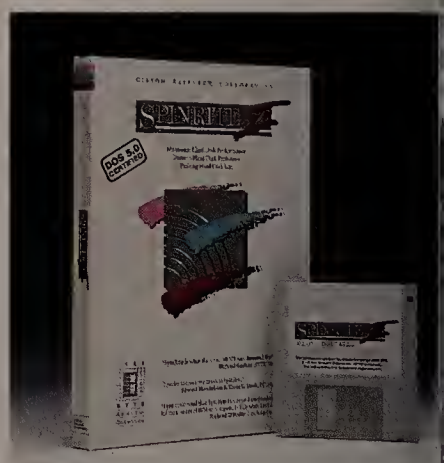
BBR3095 **DR DOS 6.0** **$89.95**
IBM PC or PS/2 compatible using Intel 8086/8088, 80286, i386, or i486 microprocessor; minimum of 512K RAM; two floppy disk drives, or one floppy and one hard drive; monochrome or color display using VGA, EGA, CGA, MCGA, or Hercules graphics adapter.

Stop Hard Disk Death! (Even After It's Too Late)

REVIEWER'S NOTEBOOK: *If you have a hard disk, you absolutely must have and use SpinRite II. You don't need to know how your hard disk works (although it will teach you if you like). You don't need to know why DOS just gave you a hard disk error, or why DOS says it can't find your valuable data. All you need to know is your hard disk is like everything else in this universe; it won't last forever. But don't despair; there is something you can do about it. With a little easy maintenance you can make your hard disk last longer, run faster, and run more reliably. Think of a hard disk as a car. Proper maintenance can make a car last indefinitely, and a little fine tuning makes it run so much better. Proper maintenance will do that for your hard disk too. SpinRite is the original in its class, and this all-new SpinRite II is still the world's finest. Take it from this Tiger Reviewer: No matter what other utilities you already own, get SpinRite II for your hard disk now.*

Byte Magazine summed it up best when they wrote, "SpinRite is what the word MUST was invented for." This vital maintenance software will give you years of extra hard disk life. It will recover your valuable data even after DOS says it can't be found. It will make your hard disk faster (400 to 500% increases have been reported). And best of all, SpinRite II will do all this automatically and easily. You simply follow along as SpinRite II thoroughly checks out your hard disk and repairs everything it finds.

The user interface and easy-to-read manual are the best in the industry. Not because they're huge, scholarly volumes of intricate details (they're not), but because they're easy to follow, written in plain English, and the manual is just the right size to read and use. It's quite a relief to finally get your hands on a computer manual you can really understand and put to good use. And that's the overall theme of SpinRite II: easy-to-use.



SPINRITE II

BBR3285 **SpinRite II** **$79.95**
Requires DOS 2.1 or above.

MEET FORMTOOL'S BIG BROTHER!

FT/Pro is the fully graphical environment that remains true to the concept of fast, efficient forms design. Easy to use as the Macintosh, with a graceful Windows-like graphical interface, FT/Pro is at home on any 286 (or 386) based machine. It's from the development team that pioneered the F3 Forms Automation System. With over 5 years of research and development, F3's Pro Designer is currently the standard for hundreds of Fortune 500 corporations as well as many of the leading forms manufacturers.

Now, a piece of this technology is available for you to create the highest quality forms, with easy to access creative functions. We've taken the superb drawing capabilities found in our advanced F3 Forms Automation System and adapted them for desktop use. Engineered specifically for forms design, FT/Pro goes far beyond the capabilities of traditional "desktop publishing" forms packages. It relies on volumes of built-in knowledge about forms standards and specialized design techniques combined with unparalleled drawing power.

And it's all very easy to use.

Add Logos, Graphic Images — In Seconds!

It's high-quality forms design made surprisingly simple, with more flexibility and creative options than with any other system. Your forms can be printed on your desktop laser or created as camera-ready art for "quick print" forms in larger quantities.

The grid in the background of this screen acts as a reference as you move through the form. FT/Pro is not desktop publishing. It is a system of forms-oriented drawing tools backed by built-in knowledge of proper forms design techniques.

Change Sizes, Colors, Typeface.

With one menu selection you can zoom in to any specific area on the form with the unique "zoom selector." Fast and easy, this method of detailing produces brilliant results with minimal effort. Change ink and paper colors with a click and zoom in for an even closer look. FT/Pro does everything you've always wished FormTool or any other forms product could do. And more.

Instantly Converts FormTool Forms.

FT/Pro allows you to protect the investment you've made in FormTool because it automatically imports and converts your text-based FormTool forms to full graphics forms in just seconds! Converted forms can be enhanced as you view FT/Pro's true WYSIWYG display including fonts, colors, graduated screens, tints, logos and a host of special effects.

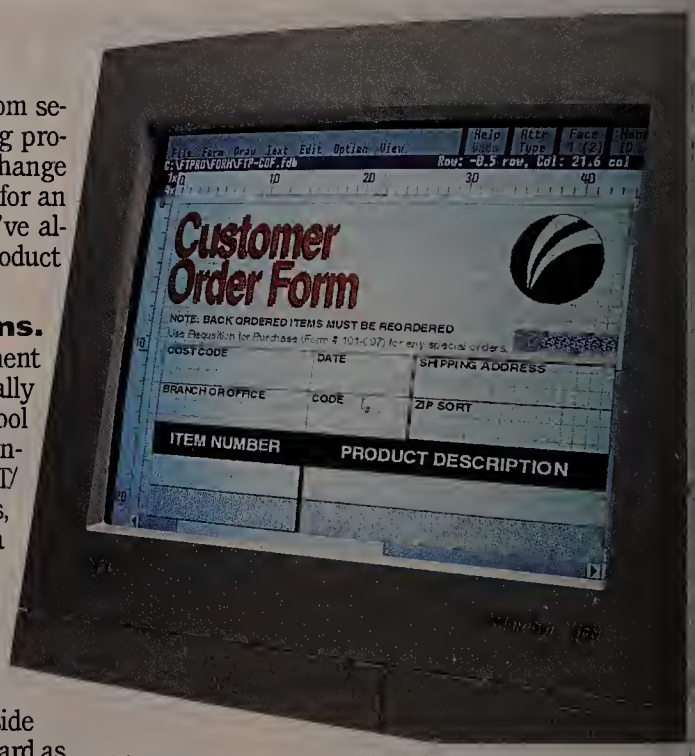
Your FT/Pro forms can contain an unlimited number of fields per page, and up to 32 pages in a single form — including front and back. Dress up your invoices, purchase orders, checks and other forms that are presented outside of your office. Your FT/Pro forms will work as hard as your existing forms, but will bring a new level of quality and authority to all of your forms.

Of course, FT/Pro allows you to create new forms from scratch with its sleek, pull-down menus and easy text editing functions.

Suddenly, your forms have a future. As your company grows, your FT/Pro forms can be instantly reworked for commercial manufacturing, or conversion to electronic (paperless) forms. No other forms product has so much technology built in.

No Hardware Upgrade Necessary.

FT/Pro is extremely compatible. Its own graphical environment delivers all the speed and power you need for efficient forms design on 286 or 386 machines. Your new graphical forms can be printed on virtually any Hewlett-Packard LaserJet or PostScript compatible printer. As desktop-published, "on demand" forms become an important aspect of information management, FT/Pro allows you to create more professional-looking forms to serve this need by fully exploiting the untapped capabilities of the printer.



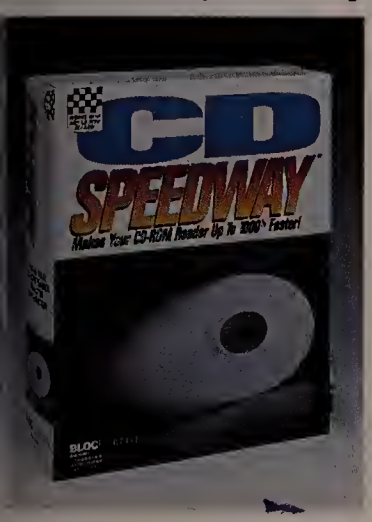
FT/Pro

BBR1023-3 **FT/Pro Upgrade** 3½" **$99.00**
BBR1023-5 **FT/Pro Upgrade** 5¼" **$99.00**
Supports 286 and 386-based IBM or compatible computers. Requires 640K RAM; supports EGA and VGA displays. Complete mouse support (although mouse is optional). PostScript, Hewlett-Packard LaserJet laser printers (1.5 megabytes printer memory required).

Make Your CD-ROM Reader Up To 1000% Faster!

REVIEWER'S NOTEBOOK: *Just released and available only through TigerSoftware. One of the hottest breakthroughs in computing! The software solution to CD-ROM slowdown that increases your CD-ROM reader's speed by up to 1000%...The smartest new innovation to CD-ROM this year...Tested 100% compatible with the leading readers on the market today, including NEC, Sony and Chinon.*

We tested CD Speedway with dozens of popular titles, including four which are available with our NEC CD-ROM readers: Mammals, World Atlas, U.S.A. Atlas and U.S. History. We found spectacular speed improvements! Example: Mammals — displaying the order of mammals was 245% faster. U.S. History — Topic: abortion, complete listings 2100% faster! U.S.A. Atlas — Topic: education, 1300% faster, the second access was 6900% faster! CD Speedway actually gets faster as you use it. Browses, searches, retrievals are as fast as a hard disk.



With today's CD-ROM explosion, CD Speedway is the perfect product at the perfect time. And remember it's software, so there are no cables, boards or devices to hook up. CD Speedway makes efficient use of your system's resources to accelerate your CD-ROM reader and deliver scorching performance. It installs in seconds, is extremely flexible and simple to use. Even better performance when used in conjunction with a memory manager and/or hard disk cache.

CD SPEEDWAY Delivers Scorching Speed.

CD Speedway is the first cache designed specifically for CD-ROM readers. It will dramatically increase the response time for any CD reader from any manufacturer by hundreds of times! Many CD-ROM titles will run up to 2000% faster! In fact, we've clocked some titles at over 7000% faster! It's a new level of performance that will revolutionize the way you use your CD-ROM equipment — and make it far more productive than you ever thought possible.

CD Speedway is a unique software solution that employs the proven "Intuitive Caching" technology that transfers data to your hard disk, RAM Disk or any drive device for almost instant access. You'll find that the more you work with CD Speedway and your CD-ROM titles, the faster they will perform. The promise of CD-ROM was massive storage; the myth has always been instant retrieval — until now. Even complex color images will burst onto your screen with unbelievable swiftness. CD-ROM is about to reach its full potential...

Access Time Performance Comparisons

CD-ROM Title Tested	Without CD Speedway	With CD Speedway	% of Improvement
MAMMALS			
Go	91.2	5.1	1688.2
Orders of Mammals	3.8	1.1	245.5
Legomorphs	2.2	0.7	214.3
Menu	2.0	0.5	300.0
Elephant Movie	47.2	36.4	29.7
Return	1.8	0.7	157.2
Photo	1.8	0.7	157.1
Return	1.8	0.5	260.0
Menu	3.0	0.9	233.3
Exit	1.2	0.1	1100.0
US ATLAS			
Stat USA from DOS, 1st screen	7.0	5.1	37.3
2nd screen	10.8	0.9	1100.0
Topo Map US	2.0	1.1	81.8
Topo Map NW	2.2	1.1	100.0
Topo Map NO	2.2	1.1	100.0
Topo Map NE	2.2	1.1	100.0
Topo Map SW	2.2	1.1	100.0
Index M	1.0	0.3	233.3
Mansfield, LA	5.4	1.2	350.0
Mansfield, LA (2nd access)	6.0	1.2	400.0
Zanesville, Ohio	8.8	1.1	700.0
Text Education	7.0	0.5	1300.0
Stat Map Legal Abortion	2.6	1.4	85.7
Stat Map Life Expectancy	5.6	1.1	409.1
US Map	11.8	1.2	883.3
US HISTORY			
Start from DOS "USH"	2.2	1.4	57.1
Enter to Continue	5.0	1.8	177.8
Word	1.0	0.1	900.0
Adams	0.8	0.1	700.0
Bismark	1.2	0.1	1100.0
Subject Browse	1.0	0.1	900.0
Abortion	2.2	0.1	2100.0
Aires	2.0	0.1	1900.0

Time testing conducted on NEC CDR-73 CD-ROM reader to caching performed with 8Mb RAM Disk.

FREE TIGER DEMOS
Hundreds of Software Demos on CD-ROM

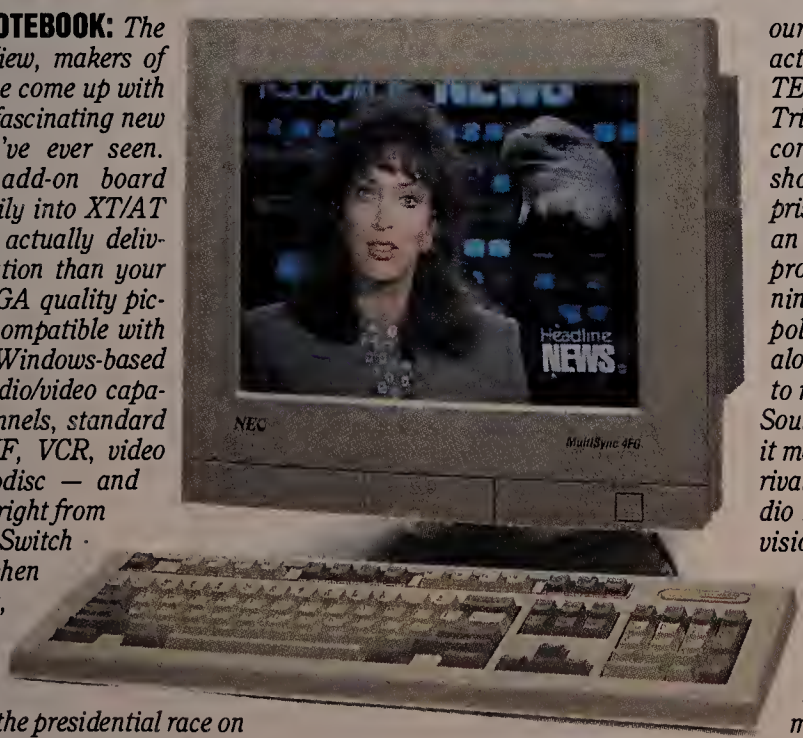
CD SPEEDWAY

BBR8500 **CD Speedway** **$99.00**
XT-compatible PC or above, 640K RAM, DOS 3.3 or higher, uses just 19K RAM, may be loaded high. Caches to any disk device: hard disk, RAM disk, etc.

WATCH TV ON YOUR COMPUTER!

Full Audio And Video — 119 Channels And Cable — Right On Your Monitor!

REVIEWER'S NOTEBOOK: *The engineers at AView, makers of Desktop TV, have come up with one of the most fascinating new technologies we've ever seen. This patented add-on board (that installs easily into XT/AT expansion slots) actually delivers higher resolution than your TV set — full VGA quality picture. It is fully compatible with both DOS and Windows-based systems. Full audio/video capabilities, 119-channels, standard cable, VHF, UHF, VCR, video camera or videodisc — and you control it all right from your keyboard. Switch on ESPN when you're printing, watch the news, catch the Space Shuttle launches, follow the presidential race on CNN — or just have some mid-afternoon laughs with "Leave It To Beaver"...*



Desktop TV connects quickly to the speaker included in the box — or connect Desktop TV to your stereo. The software, all necessary connection cables — everything you need to start immediately. Just connect your coaxial Cable TV cable to Desktop TV and all channels are instantly available. Complete installation takes just a few minutes.

Is the reception really that good? We were skeptical, too. But the fact is, Desktop TV (running on one of our NEC 3FG monitors) actually looked BETTER than our 19" Sony Trinitron over in the conference room. It shouldn't be any surprise, Desktop TV uses an ITT chip set which provides double scanning and advanced interpolation technology, along with comb filters to minimize signal noise. Sounds complicated, but it means that Desktop TV rivals the expensive studio monitors used in television stations and production houses.

We found several other uses for Desktop TV: as a high quality television monitor in the workplace to view videocassettes, deliver video presentations, view closed-circuit broadcasts and provide interactive training.

I always wanted to do this! I'm often working at my computer, preparing a spreadsheet or working on a word processing file, and thinking "I wonder who's on Oprah today?" During baseball season, it would be nice to catch a couple of innings of a daytime doubleheader from Fenway Park or tune in for CNN's Headline News. Now, Desktop TV puts a TV set inside my computer that lets me watch my favorite shows! I can return to my spreadsheet at anytime and continue to listen to the audio of the news, Good Morning America or Donahue. If the conversation gets wild, one keystroke switches me back to television.

Desktop TV supports both DOS and Windows 3.0 environments, without any reconfiguration. And I can even watch TV while my computer prints, does backups — anything that doesn't require my monitor. Desktop TV has no adverse effect on my monitor, it runs as it always does.

This is one of the hottest new innovations to come along this year, delivering a great picture on my PC screen just like my TV at home (PC displays provide more dots per inch, and Desktop TV delivers VGA-level quality). I get full 119-channel compatibility (including cable, VHF, UHF, VCR, video camera and videodisc) and great sound, with Desktop TV's superb speaker system. Desktop TV advanced technology shatters the barrier between high-quality analog video and computer-based information. Everything is controlled from my keyboard: video source, channel selection, volume control, audio monitoring and even memory settings for your favorite channels!

How Does It Work?

It's simple. The Desktop TV board installs in seconds into a standard PC expansion slot. It comes complete with cables, control software and speaker system. Just connect a standard coaxial cable, external antenna or rabbit ears to the card and you're done. Desktop TV hooks up just like your TV at home. I'll never miss a World Series game again!

DESKTOP TV

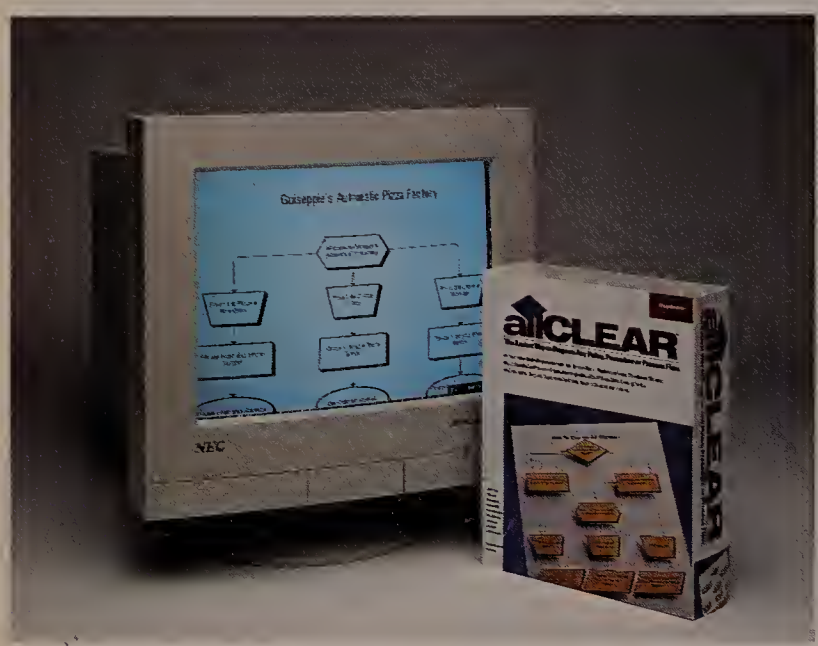
BBR3882D **Desktop TV** Dual **$299.00**
IBM XT/AT (286/386) or compatible; MS-DOS 3.1 or higher; controls available either through DOS, a TSR or Windows 3.0. Call for further details.

AUTOMATICALLY DIAGRAM POLICIES AND PROCEDURES.

What's New About *allCLEAR?*

Flow charts and diagrams have been around for a long time. They're basic, fundamental tools that have a high, proven value. Decades ago, charts were drawn manually. The Graphic Arts evolved into a full-time profession in which a good-size chart took a week. Then came the computer. Draw-it-yourself software forced the user to play artist — preplanning, drawing boxes, connecting lines, fitting text, etc.

But imagine for a moment if no one had to draw. What if you could create flow charts, training diagrams, or charts — any procedural diagram — and let them spring into being simply by typing in plain English? Or directly from existing data in spreadsheets, database or text files?



Impressive Charts in Three Easy Steps...

1. Begin by simply typing a description of your procedure, policy, or instructions into your word processor. Or use information from any existing text file. The punctuation mark you place at the end of each step in your procedure tells *allCLEAR* how the steps are related. For example, a period indicates a step in a procedure, a '?' begins a Yes/No decision branch — in seconds, *allCLEAR* has created your chart.

2. Now you can scroll through your diagram; walk through the paths — even see a multi-page view or WYSIWYG print preview. Here is where *allCLEAR's* unique 'layout intelligence' can instantly display your chart in various layouts — each logically correct for your procedure. You can adjust box shapes, font sizes, or borders in seconds. Change page orientation or box sizes, add drop shadows, or reduce the chart size in a keystroke or two. Instantly, your diagram is redrawn displaying those changes.

3. It's time to print your diagram, or export the file for desktop publishing applications. *allCLEAR* supports hundreds of printers from dot-matrix through PostScript — even built-in, intelligently downloaded fonts for HP LaserJets. For desktop publishing or incorporating into reports, diagrams can easily be exported in a variety of file formats.

Seeing Is Understanding.

"Ideal for getting a grip on corporate policy or organizational structure."

–PC Magazine

*"An **allCLEAR** chart sweeps away the verbiage, creating a clear view of the task."*

–Esther Dyson, Columnist

Written or spoken instructions are often misunderstood. But *allCLEAR* creates charts which are simple to read, logical and organized. They cut through the verbal clutter and lead the viewer through progressive, unmistakable steps to completing the task.

"Tremendous flexibility... extremely attractive presentation quality graphics."

–PC Week

The Agenda Connection: A Special Offer From Tiger.

A perfect fit. Especially in business where communication is essential. Clear communication. Agenda is the perfect tool for organizing all those fast notes, names, addresses, project schedules and more. Just dump it all in, then ask Agenda to sort through and pull out just what you need. Which makes it a perfect source of charting and diagramming information for use in *allCLEAR*.

allCLEAR

BBR3072-3 **allCLEAR w/Agenda** 3½" **$199.95**
BBR3072-5 **allCLEAR w/Agenda** 5¼" **$199.95**

Available only as bundle.

System Requirements: IBM XT, AT, PS/2 and compatibles; 640K memory; DOS 3.0 or later; hard disk; CGA, EGA, VGA, Hercules, or compatible; any dot-matrix, HP LaserJet, HP DeskJet, Canon, or PostScript printer.

THE PALMTOP PC FAX MACHINE!

REVIEWER'S NOTEBOOK: *Turn your PC into a full-featured, lightning fast fax machine. DoveFax provides 9600-baud fax-modem features and 2400-baud data modem capabilities. You receive faxes without interruption and a handy re-dial feature makes sure your fax gets sent. Fully Group III compatible, The DoveFax delivers the highest quality facsimile reproduction of any product we tested. Installs in 5 minutes. Tested 100% Hayes compatible. Communicate reliably with over 2 million fax machines around the world. Your PC is a perfect fax machine — create your documents and fax them instantly — and take advantage of the features engineered into each DoveFax — and the power of your computer.*

DoveFax is your connection to other computers, database services, bulletin boards and more. DoveFax devices are very competitively priced, loaded with value — hundreds less than buying a modem and fax machine separately.

DoveFax allows you to use the power of your PC to create handsome cover sheets with great looking type and graphics. DoveFax supports multiple phone books, distribution lists, call grouping and the ability to fax documents to multiple locations. Schedule and send faxes whenever you choose — even when you're not around — to avoid high-priced phone rates. When a fax comes in, it's automatically logged.

DoveFax includes the most extensive set of built-in fax and communications software we've ever seen. And, compatibility is no problem — DoveFax meets all appropriate FCC, EAI and CCITT telephone standards, along with many international standards.

Here's an added bonus-value: PCs, Macs and others all use the same award-winning DoveFax hardware — all you need is the right cable and software. (Available separately.)

FREE FROM TIGER!

FAXMANIA and ACCU-WEATHER

With purchase of DoveFax.

DOVEFAX

BBR6257 **DoveFax/Windows** ... **$229.00**
BBR6258 **DoveFax/DOS** **$199.00**

The Incredible Dr. Halo Upgrade: Just $49.95

REVIEWER'S NOTEBOOK: *There is no better package available for complete imaging. Other packages give you bits and pieces, but none can compare with the vast capabilities of Dr. Halo IV. Create your own eyeball-grabbing images, capture existing images and work creative magic on them, or convert images to and from a variety of formats. It's all under one roof — officially known as the Dr. Halo IV Paint & Image Pak. Keep reading, we'll fill you in on how you can upgrade to this dynamic new product...*

Open the box and get ready for a slew of easy-to-use features, like large-image support (work on images larger than the screen!), sophisticated palette support (up to 256 colors on any display), gradient fills that produce the smoothest shaded objects and background we've seen, support for all popular SuperVGA boards, incredible new printing capabilities for top-notch halftones and enhanced font support for great looking type. We love the ability to convert virtually any file formats — no other package provides more comprehensive conversion tools. You can grab screens from anywhere, view 16-bit and 24-bit images on any screen and create blazing slide presentations.

Everything's here. Just add imagination and creativity to create great images. This product is enjoyed by over 3 million users every day! It's the one paint package that handles all of your imaging needs with grace and power. You can draw, paint, cut, paste, flip and rotate images in up to 256 colors and create your own custom palette to select and use the colors you want. The advanced gradient capabilities generate ultra smooth shapes and backgrounds for beautiful presentation graphics. Speaking of presentations, Dr. Halo IV includes fades and dissolves that make great transitions for slide shows. With the ability to work on large images comes the convenience of precise pixel-by-pixel editing, and zooms.

Your incredible screen images translate to magnificent printed output. Amazingly clean and crisp — with a variety of halftones — thanks to Dr. Halo's unmatched printer support and proprietary driver technology.

DR. HALO IV

BBR3261 **Dr. Halo Paint & Image Pak** **$119.95**
BBR3262 **Competitive Upgrade** .. **$49.95**

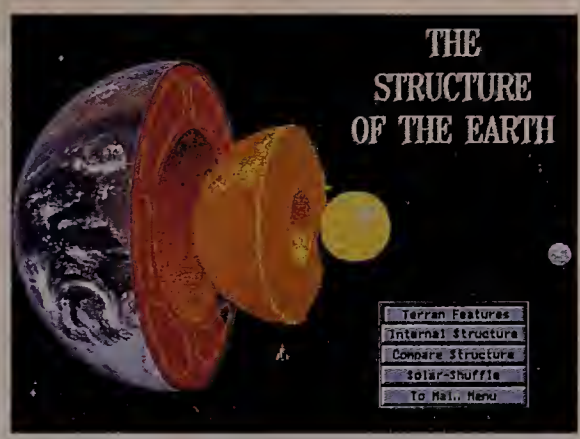
Information & Orders: **1-800-888-4437** Int'l Orders: 305-443-8212 Fax: 305-529-2990 **FREE** FEDERAL EXPRESS **SHIPPING**

Circle 259 on reader service card

THE SOLAR SYSTEM ON YOUR PC.

REVIEWER'S NOTEBOOK: *An explosive new hit title. Sometimes you take the dazzling beauty of our planet, our solar system — and if we dare imagine — the universe. Since the early astronomers aimed their primitive telescopes toward the sky, man has worked with curious passion to understand how the universe began, how it sustains itself — and what its future holds for its only (known) inhabitants.*

Orbits is a brilliantly interactive space simulator and comprehensive space atlas that brings the universe to your PC! Spectacular 3-D graphics demonstrate the operation of our solar system. Animated sequences show you the effects of gravity on various planets, the movement of the sun and moon. Compare the planets' characteristics, structure, chemical makeup and more. Simulations of eclipses, nuclear processes of the sun and the life of comets. View actual satellite photographs from NASA and the Jet Propulsion Laboratory, watch a spectacular presentation on the birth and death of the sun. See the interior structures of the sun and moon, create reports and comparisons on anything, and play a few rounds



of Orbit-Trek, the built-in brain teaser. A great educational tool, Orbits is also an entertaining way to spend some time with your PC. It brings the stars, the planets and beyond — into focus.

And there's much more! Like an examination of the mysterious rings that surround Saturn. These rings, made up of debris, toxic gas and other materials, can be seen close-up with the help of NASA photographs. And the secrets of Saturn itself are revealed through graphs and illustrations available with just a keystroke. Let's move on to the largest planet: Jupiter. If you've always wondered what the large spot was, here's your chance to investigate. NASA photos, colorful illustrations and descriptive text explain the make up of the spot that is estimated to be thousands of miles in diameter. Switch to Mars and examine the "red planet" in great detail. Could there be life? Could there ever have been life? Is there water? What does the surface of Mars look like? Just a few keystrokes answers these questions and ignites curiosity. What are winters like on Mercury? How many moons does the mysterious planet of Neptune have? How does our moon influence the tides?

Then take a close look at our own planet: Mother Earth. Amazing in its ability to support life. Explore the Earth's atmosphere, its core, its relationship with other planets and more.

For instance do you know... where a world shaped like a peanut exists... or where fountains of gasses hotter than acetylene torches stretch for distances greater than that between the Earth and the Moon... or where a storm that could swallow our entire Earth has raged for over 300 years... or where "superbolts" of lightning strike with enough energy to instantly incinerate a city? These are just some of the exciting and alien locales you will visit in ORBITS!

ORBITS

BBR4103-5 **Orbits** 5¼"	**$59.95**
BBR4103-3 **Orbits** 3½"	**$59.95**

A Guided Tour of the Human Body.

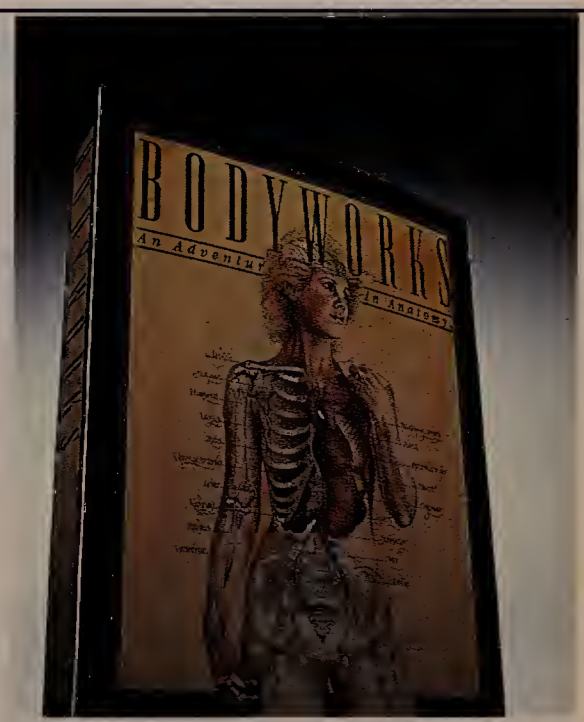
The human body. A perfect machine. It grows and develops, protects and heals itself and is designed to last for decades. Now the wonder of the body is combined with the power of the PC to produce a fascinating journey into its structure and functions. You'll see detailed, full-color graphics of the entire human body and a comprehensive database of facts, descriptions and explanations. Do you know the exact function of the hypothalamus? How about the kidneys? How do bruises heal? How does the brain work, and where is your duodenum? Experience a world of knowledge and beauty that provides profound insight into life itself. It's called BODYWORKS, and it could be the most interesting software program you'll ever own — perfect for students, artists and hobbyists.

Explore the cardiovascular system...

You begin by exploring the major body systems: select the skeletal system and view the bones and how they work, the joints, mechanics of the ball and socket. Select the muscular system and see the tremendously resilient human muscle, capable of developing enormous strength. Discover how the delicate muscles in the eye allow instant focusing and movement, far beyond the capabilities of even the most sophisticated camera. Move to the nervous system, and see how the signals sent to the brain can detect even the slightest touch to the skin. Learn about how your nervous system allows the brain to instruct the body to perform complex movements — like walking! Then select the digestive system — the body's systematic breaking down of food. Its incredible ability to process and extract nutrients. From the mouth to the intestines, BODYWORKS shows you in great detail how your body nourishes itself, how it accumulates fatty tissue (and how it uses fat).

...Or discover the workings of the brain.

There are complete sections on lymphatic, endocrine and cardiovascular systems. Explore the most amazing four-square-inches of tissue man has ever seen — the human heart. How it feeds the body with a constant supply of necessary chemicals to sustain life. You'll learn how the human heart can be damaged, and exactly what happens when someone suffers a heart attack. When your child asks "Where do babies come from?" you can simply select the section on the human reproductive system for a clinical explanation of the process.



You'll see all of the organs and tissues of the body, each described in exhaustive detail. Colorful graphic screens also provide information on sports injuries, first-aid advice on illness, insect and animal bites, along with other topics. Just click or select any organ or system for instant retrieval of thousands of facts.

BODYWORKS

BBR4101-5 **BODYWORKS** 5¼"	**$59.95**
BBR4101-3 **BODYWORKS** 3½"	**$59.95**

Wouldn't You Like To Know How Your Car Works?

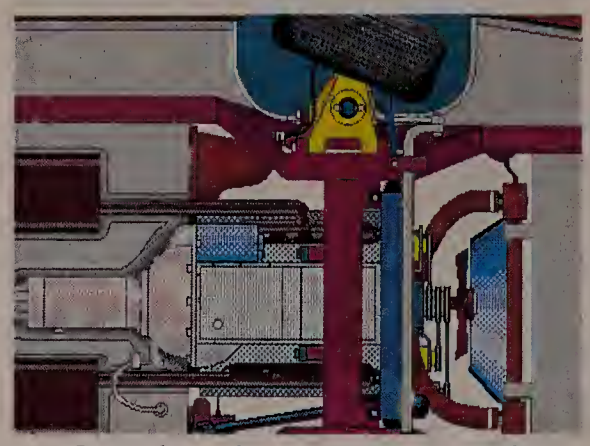
New AUTOWORKS Is The Fast, Fun Way To Explore The Inner Workings Of The Automobile.

REVIEWER'S NOTEBOOK: *Unless you're an auto mechanic, you probably have no idea how a fuel injection system works, how a transmission works, how a car's suspension system operates — or even how the ignition actually operates. It's quite interesting...*

The automobile is a masterpiece of engineering. Today's cars are filled with fascinating mechanisms, systems and ingenious devices. AUTOWORKS examines the automobile from bumper to bumper: from a basic overview of each system, to in-depth graphics and explorations of how your brakes, belts and suspension work. Animated sequences illustrate — and detailed diagrams are everywhere.

Just a few minutes and you'll be hooked. You'll want to know how your gas gauge and speedometer works, your engines' lubrication system, pistons, your air conditioner, brakelights, alternator — everything!...AUTOWORKS also gives you information on topics like emission control, ethanol fuel, electric cars, diesel engines, turbochargers vs. superchargers, rust proofing, unibody construction, auto safety standards, and more. Sit down with AUTOWORKS before you start looking for a new car and know what you're buying.

AUTOWORKS is like having the ultimate owner's manual for your car. You'll find out exactly how the power generated by your engine (through combustion) is transferred from the crankshaft, to the drive train and on to actually turn the wheels. It's an amazing design feat. See how the gears work deep within the transmission's housing, and the gearbox controls the delivery of power to the drive shaft. Find out how the internal combustion engine creates all that horsepower. This unique new title is from the publishers of AUTOMAP and BODYWORKS, two of the industry's smash hits of 1991. Like AUTOMAP,



Discover how modern suspension systems provide comfort and safety.

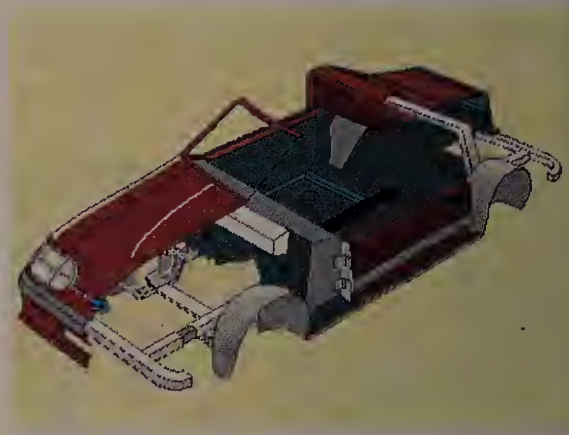
AUTOWORKS contains a massive database of information and megabytes of colorful graphics. The graphics, like the ones on this page, are well drawn and easy to understand. Even the most complex part is explored and explained. Which means you can learn as much as you want about how a car works — down to the tiniest technological marvel and have a lot of fun while you're doing it.

Like everyone, I take my car into "the shop" to get it worked on occasionally. I feel like an idiot when the mechanic explains the problem. A conversation about a simple brake job is enough to make my head spin. After a few minutes with AUTOWORKS, I understand how the disc works, what the drums and master cylinder, power booster, calipers, proportioning valve and return springs do. I think before my next visit, I'll brush up on just exactly what a "tune-up" is. It will save time, because I'll know what has to be done. It could also help me avoid having unnecessary work done. If I want to do-it-myself (I'll start by changing the oil), AUTOWORKS gives me all the knowledge I need to start.

Move your way as deep into the workings of your car as you like. Click to fuel injection and learn how advanced multiport technology works; you can actually follow the flow of fuel into the manifold. See an injector at work and learn about fuel additives and octane ratings.

Children love AUTOWORKS because it's colorful and easy to use. It's also a great way for them to understand one of the most important advances in mankind's history — the proliferation of the automobile. We guarantee that AUTOWORKS will provide hours of educational enjoyment.

This new product is in stock and ready to ship.



A fascinating study of unibody construction.

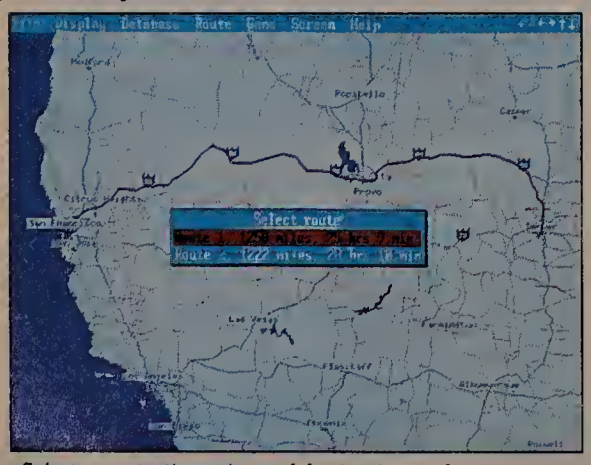
AUTOWORKS

BBR4104 **AUTOWORKS** **$79.95**

The Intelligent Road Atlas For Your PC!

Planning a vacation? Heading out on the road on business? Now there's a system that helps you plan any road trip for fastest, prettiest or most convenient route — with hundreds of up-to-date, color maps right on your computer screen.

Clear, detailed maps that can get you anywhere in the United States that you want to go. Just tell AUTOMAP where you're going, when and where you'll be starting from, what areas you'd like to avoid, what areas you'd like to visit on the way and how you like to drive. AUTOMAP's powerful intelligence takes over from there. Instantly, it searches its massive database of over 300,000 miles of roads and highways for the best route to meet your requirements. It even gives you a list of alternative routes if you decide you'd like to wander a bit.



Select your starting point, end destination, and areas to visit and let AUTOMAP create a detailed map of your next trip!

AUTOMAP also gives you a list of "places" from over 50,000 in its database. It's like having a travel guide pointing out the very best there is to see and do. If you're a business traveler, you won't have to worry about being unfamiliar with new territories, just a quick session with AUTOMAP and you'll not only know exactly where you're going, you'll be on the very best road to get there.

AUTOMAP allows you to view your entire journey as a full color map and gives you all the details on mileage. Zoom out to see the entire region, or zoom in to see every detail. AUTOMAP's driving instructions list all the roads you'll be traveling, exactly how far to go, exactly where to turn and even the signs to look for! These maps and directions can be viewed on your screen and printed out to refer to as you need them.

Pressed for time? Need a hotel? AUTOMAP provides you with travel times, mileage, and information on hotels and attractions. It also provides information on many cities and precise directions (including landmarks) for the most scenic drives in and out of each of them. What a great vacation planner!

Government Highway Data.

AUTOMAP uses data with the renowned accuracy of government sources. It has been designed to remain accurate with constant updates of new maps and details as they become available. AUTOMAP has proven itself with the most demanding businesspeople and vacationers. Surveys show that AUTOMAP can save up to 20% in driving time and related costs.

ALL NEW! AUTOMAP EUROPE.

Scope Out The Autobahn — On Your PC.

REVIEWER'S NOTEBOOK: *Just Released! Tiger is proud to be among the first to have AutoMap Europe in stock and ready to ship. The makers of AutoMap have created another hit — the definitive guide to discovering Europe by automobile.*

Visiting the historical romance of Rome, or the Greek Islands? AutoMap Europe is the ultimate

travel planner. Plan your route either by shortest, quickest or most scenic. Detailed driving instructions tell you every turn, what signs to look for — exactly how to reach your destination. Includes scores of precise, full-color maps. Zoom in to find one specific sleepy lane — and out to get a look at the entire region. Creates, in effect, a customized driving guide for any european trip. AutoMap Europe is perfect for sightseers, student travelers, business planning or that once-in-a-lifetime vacation.

BUY AUTOMAP--GET USA ATLAS FREE!

AUTOMAP

BBR4098A **AutoMap** 3½" **$69.95**
BBR4098B **AutoMap** 5¼" **$69.95**
BBR4106 **AutoMap Europe** Dual **$99.95**
Hercules, CGA, EGA, VGA, 512K RAM, hard disk, mouse recommended.

The 99.9% Accurate OCR Software For Windows.

REVIEWER'S NOTEBOOK: *Who has time to re-type text? If you own a scanner, you'll never have to consume precious hours duplicating work again. New ReadRight Personal is the most accurate Optical Character Recognition (OCR) software we've seen, delivering 99.9% accuracy in our testing (it missed two commas and a period). Every word, regardless of the attributes or formatting was precisely recorded using our Logitech ScanMan and ReadRight Personal. That scanned text (from a magazine article) was then instantly available for use in any software application. Amazingly accurate, fast and simple.*

ReadRight offers a host of innovative new techniques that propel it far beyond the competition. There's advanced page decomposition (which automatically separates text and graphical elements even on complex page layouts), intelligent merging of scanned "strips," dynamic page display, immediate recognition feedback and complete error checking. The "Accurate Omnifont Technology" technology automatically recognizes a wide variety of font sizes and designs — even when they're mixed on a single page!. There's no need to "train" the software to recognize the characters. ReadRight can accurately scan typewritten, laser-printed, typeset and NLQ dot-matrix. ReadRight reads them all with unmatched precision.

Designed specifically for the Windows environment, ReadRight allows various zoom levels for close examination of scanned areas. The Toolbox defines, deletes, magnifies and selects areas of your scan and allows you to then customize the content and format of the areas to increase accuracy during recognition.

No DDE or Clipboard Needed!

You can even copy text directly via the exclusive Autopaste™ option and paste it into other Windows applications.

READRIGHT

BBR3281 **ReadRight** 3½" . . **$199.00**
IBM AT, PS/2, or 100% compatible. 4MB RAM. Hard disk. Microsoft Windows (3.0 or higher). MS-DOS or PC-DOS (3.1 or higher). Mouse.

LEARN WINDOWS IN AN HOUR!

As with any new task, "visualizing" teaches you far more than just reading about it. And although Windows was built on the concept of ease of use through its interface, some aspects of Windows may be new and perhaps a little intimidating for first-time users.

WIND•EASE is the innovative software tutorial that allows you to forego the lengthy manuals and get right to work. Real drop-down menus and application menus provide dramatic insights into the power and beauty of Windows 3.0. Sophisticated in presentation, it facilitates in-depth understanding by matching Windows' commands, visual displays, and dialog boxes to clear, concise explanations.

Perfect For Beginners And Intermediate Users.

WIND•EASE gives you a thorough understanding of Windows 3.0. If you're new to the environment, you'll quickly grasp the rudiments and progress quickly through its many advanced features. If you're a current Windows 3.0 user, you'll find loads of information on features you may never have used before.

As you quickly learn Windows you'll discover WIND•EASE takes you beyond the user's guide. You'll learn how to install and use other applications, how to set up networks, printers and fonts, how to create time-saving macros, how to customize PIFs, and use MS-DOS Executive. There's dozens of tips and techniques for using Windows 3.0 to its fullest.

WIND•EASE is a rich graphical program with *18 distinct program-segments*, designed to isolate and teach you window concepts. The unique and easy installer *allows you to choose the segments you wish to install. The program is structured for ease of use and thoroughness. Consequently, it is ideally suited for corporate training programs,* at home/office users, and even first time Windows users.

WIND•EASE

BBR5070 **WIND•EASE** 5¼" & 3½" **$29.95**
Requires Microsoft Windows 3.0, 286 or higher processor, 640K plus 1MG extended or expanded memory, hard drive, VGA monitor, mouse.

MUSTEK COLOR SCANNERS

This is the definitive line of color scanners. From the sleek, precise 300 dpi color hand scanners (for both DOS and Windows), to the explosive full-page 600 dpi (that's right — 600 dpi!) flatbed scanner — featuring a giant imaging area. This is world-class technology from Mustek, a leader in color scanning devices. Unbelievable resolution and reproduction — up to 262,144 colors! Scan images in True Color, Grayscale, Dithered Color or Line-art formats, the software included gives you complete control.

Ideal for designers, professionals or anyone who needs to capture, manipulate and print quality color. Plus, there's free bundled software for color retouching, grayscale enhancement and OCR (Optical Character Recognition) and complete scanned image management. Four instruments are available: the Mustek color hand scanner (300 dpi for DOS or Windows), the Full-page (sheet-fed) 300 dpi scanner and the incredible new 600 and 300 dpi full-page flatbeds.

All New Flatbeds!

Full 262,144 color capabilities! The Mustek Flatbed scanners are available in two flavors: The new 300 dpi model — or the outrageous 600 dpi flatbed scanner! You'll scan colors that capture the richness and vibrance of your original, and the detail is studio-quality. These scanners shatter the barriers of price while solidly setting a new standard of performance.

All New Sheet-Fed Scanner!

The fastest and easiest way to scan a standard size page! Just slip your original into this powerful 300 dpi color scanner and watch deep, rich color explode on your screen.

MUSTEK

BBR6215 **M-6000CG Color Scanner w/Perceive OCR & Rainbow Studio** (DOS) **$299.00**
BBR6220 **M-6000CG Color Scanner w/Perceive OCR & Picture Publisher 3.0 LE** (Windows) **$399.00**
BBR6225 **Full-Page 300 dpi Flatbed Scanner w/Picture Publisher 3.0 LE and Perceive** **$999.00**
BBR6230 **Full-Page 600 dpi Flatbed Scanner w/Picture Publisher 3.0 LE and Perceive** (Windows) . . . **$1199.00**
BBR6231 **Mustek 300 dpi Sheet-Fed Scanner w/Picture Publisher 3.0 LE and Perceive** (Windows) **$699.00**

THE MEMORY SHOP

REVIEWER'S NOTEBOOK: *Memory is a hot topic. It seems like everyone wants to upgrade their system by adding SIMMs, or upgrading the memory on their laser printer. But there's a lot of confusion about what they actually need and how much it should cost. Then there's the issue of the quality of the memory itself — it's not all the same. Some "dirt-cheap" memory chips are, well...unreliable, to put it mildly. I wouldn't put it in my machine, and I wouldn't want you to install it in yours...*

When you call TigerSoftware, you'll speak to someone trained specifically by leading hardware manufacturers to help you choose the right memory for your system and offer helpful hints on installation — it's easy! Just tell us what kind of machine you have, what applications you run — and we'll outfit you with the best possible memory upgrade. The Z-COM line of memory products all come with simple, understandable instructions that take the fear out of doing it yourself — today's machines are actually designed for simple memory upgrades. And Z-COM memory is the best in the business. They make memory for some of the industry's top names. Would Apple, Compaq, HP, IBM, Sun, Sharp, Toshiba and a host of others put their logo on anything but the best?

Z-COM

BBR6430 **SIMMS 256MB × 9MB 80ns** **$14.00**
BBR6431 **SIMMS 1MB × 9 80ns** **$48.00**
BBR6432 **SIMMS 1MB × 9 70ns** **$50.00**
BBR6433 **SIMMS 1MB × 9 60ns** **$52.00**
BBR6434 **SIMMS 4MB × 9 80ns** **$178.00**
BBR6435 **SIMMS 4MB × 9 70ns** **$179.00**
BBR6436 **SIMMS 4MB × 9 60ns** **$199.00**

Z-COM MEMORY UPGRADES

For AST Systems

BBR6437 **1MB for AST Premium 386C, 386/16** **$99.00**
BBR6438 **1MB for AST Premium II 386SX20, 386SX16, Cupid-21, AST Premium 386; 25 & 33** **$59.00**
BBR6439 **1MB AST Executive Notebook** **$72.00**

For Compaq Systems

BBR6440 **1MB for DeskPro 386/20e, 20, 25e & 25** **$80.00**
BBR6441 **1MB for SLT/286** **$89.00**
BBR6442 **1MB for Portable LTE/286** **$93.00**
BBR6443 **1MB for Portable 368S/20** **$179.00**

For Hewlett Packard LaserJets

BBR6444 **1MB for LaserJet II & IID** **$85.00**
BBR6445 **1MB for LaserJet IIP, III & IIID** **$80.00**

For IBM PS/2

BBR6446 **2MB (expandable to 14MB) Add-on Board for Models 50, 50Z, 55SX, 60, 65SX** **$267.00**

For Toshiba Laptops

BBR6447 **1MB for Portable T1000SE, LE & XE** **$119.00**
BBR6448 **2MB for Portable T3100SX** **$119.00**
BBR6449 **2MB for Portable T3100E** **$119.00**
BBR6450 **2MB for Portable T3200SX** **$119.00**
BBR6451 **2MB for Portable T5100** **$119.00**

SIMM Modules have a 5-year warranty; all other memory carries a lifetime warranty.

Crosstalk Makes Communications Ridiculously Simple!

New Crosstalk Communicator Also Makes It Irresistibly Affordable...

REVIEWER'S NOTEBOOK: *The world of communications (between PCs, PCs to minis and PCs to mainframes) just got easier and much more affordable with the introduction of Crosstalk Communicator. This great new product gives casual users all the power and reliability of Crosstalk's industry-renowned Mk 4 communications package with a sleek, menu-driven interface that features a point-and-shoot Dialing Directory. A list of pre-defined entries for popular information services makes Crosstalk Communicator exceptionally easy to use.*

Get on line in just three minutes, transfer files, capture data or talk to other systems. And although Crosstalk Communicator is fast and easy, its features are rich and well designed. You get 13 terminal-emulation options including ANSI color graphics; Televideo 900 series; IBM 3101 character and block mode; and DEC VT52, VT100, VT102, VT220 and VT320. For file transfers choose from 8 simplified protocols including XMODEM (several flavors), YMODEM, YMODEM-G, ZMODEM, Kermit and CompuServe B plus.

Crosstalk Communicator supports over 50 modem brands; simply select the type you're using from the menu during installation. All in all, Crosstalk Communicator worked like a charm in our tests. File transfers were fast and error free (we used both 2400 and 9600 bps modems). The scripting is a true performer, including a built-in text editor and script compiler so Communicator can actually learn how you use it — making it simpler next time. There's a collection of pre-written scripts to choose from, including one that enables you to quickly set up your own mini-Bulletin Board complete with password protection, menus and messaging.

Much easier to learn than Procomm Plus, while offering more features.

It's Your Turn To Communicate...

It wasn't so long ago when PC-to-PC file transfers, connecting to minis and mainframes and reaping the benefits of information services was reserved for advanced users. Modems were complex and expensive. The software that ran them was filled with cryptic commands and mysterious acronyms.

Times have certainly changed. Today's modems are compact, fast and very intelligent. And the new breed of software is led by Crosstalk Communicator. Everything is menu-driven, requiring no programming knowledge or sophisticated commands. Novice users find Crosstalk Communicator not only easy to use — but a lot of fun as well. Just point-and-shoot to dial up numbers, select from the men to connect to any of the popular infor mation services available today, tal to other PCs, minis and mainframe (using one of 13 different termina emulation options) easily.

Crosstalk Communicator enable you to transfer files in a snap. We sen some color screen captures to ou color separator during production c this catalog, using the ANSI format and found it incredibly easy to use. W had been using another brand — bu we've switched to Crosstalk Commu nicator — it's just so much easie There are 8 different file transfer pro tocols to choose from, just select an go! Parameters for communication are simple to set up and you can ac cess disk directories and DOS func tions from right within the program It's all surprisingly simple and you'll be amazed a how much you'll be able to do in your first half-hour.

Crosstalk Communicator

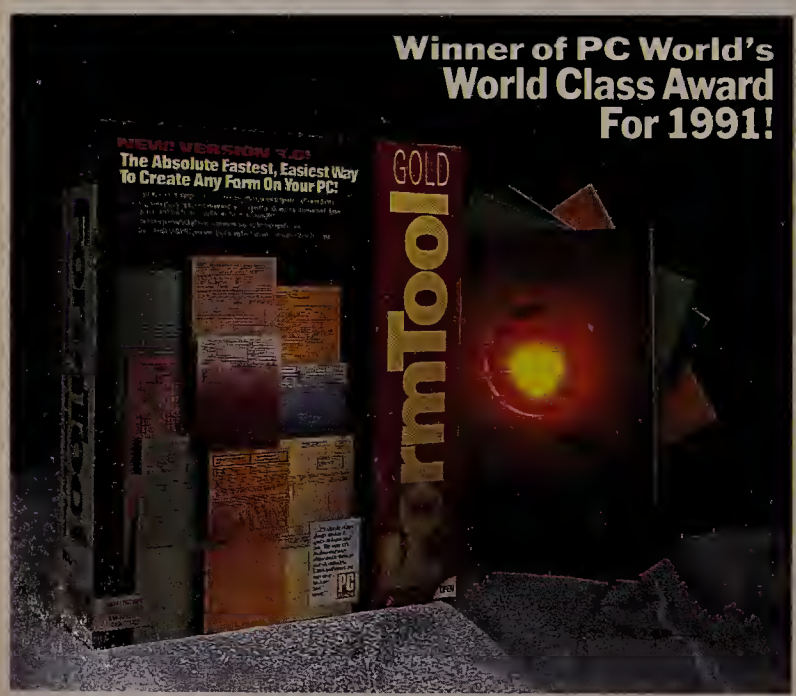
BBR3097 **Crosstalk Communicator** **$29.90**

Operating system: *PC DOS or MS-DOS version 2.1 or newer.* ***Environments:*** *Microsoft Windows, DESQview, other windowing programs.* ***RAM requirements:*** *320 KB.* ***Speed*** *300 bps to 115,200 bps.* ***Communications devices supported:*** *Most popular modems, including Hayes, Intel, U.S. Robotics, and other auto-dial modems.* ***Terminal emulators supported:*** *DEC VT52, VT100, VT102, VT220, VT320, IBM 3101 (block and character modes), Televideo 912, 920, 925, 950 series (including block mode). Generic TTY terminal. ANSI color graphics.* ***File-transfer protocols:*** *XMODEM (CRC, 1K, and CHECKSUM methods), YMODEM (including YMODEM-G), ZMODEM, Kermit, and CompuServe B+.*

The Best-Selling Forms Software in the World!

Just Sit Down and Create a Great Form...

It's easy to see why FormTool is the best-selling forms package in the world. It's the fastest, easiest way to create, edit, manage and print custom, professional forms for immediate information gathering.



The ability to quickly gather data and put it to work is critical to corporate information flow. FormTool's "Intelligent Line Drawing" and its hardware compatibility make it an indispensable tool for businesses of any size. That's why FormTool has found a home in well over half of the Fortune 500 list, along with thousands of educational institutions, government agencies, hospitals and financial organizations around the world. They've discovered FormTool's productive power.

Unlike its competitors, FormTool doesn't require additional memory, a graphics card, color display, mouse or scanner. It runs beautifully on anything from an XT to a 486. FormTool now supports hundreds of dot-matrix, letter-quality, daisywheel, thermal as well as Hewlett-Packard printers, and new support for PostScript lasers.

Draw Forms Fast.

FormTool streamlines the PC's ability to draw forms. Lines of any weight, boxes of any size, grids of any complexity and more can be quickly drawn with just a few keystrokes. If a grid isn't quite right, one keystroke re-draws it to meet your exact specifications, then displays it on the screen with our WYSIWYG display. Zoom in to see a close-up of your form, then zoom out for the full page view. Quickly make any revisions, preview it again — then print it.

This preview capability combines the advantages of a graphics-based, on-screen display with text-based, lightning-fast processing times, making FormTool even easier to use.

Instant Revisions.

FormTool's ability to make instant revisions to your forms gives you the flexibility to create exactly the proper form to meet the requirements of your work flow. Ideal for users of any experience level.

Enter Text in Seconds.

To handle text, FormTool contains a forms-oriented word processor that allows you to move quickly through the form inserting captions, instructions, word-wrapped text and special symbols, and characters. FormTool will enter your text into position automatically.

An All New Forms Manager.

And FormTool Gold contains an all new Forms Manager that makes organizing, retrieving and archiving forms faster and more efficient.

Includes a built-in backup and restore, the ability to instantly view forms from a list on your screen and a new set of features that allow you to "move," "copy," or "delete" forms from the Forms Manager. FormTool's Forms Manager also includes hard disk directory support, allowing you to store forms anywhere — or you can assemble form sets in just seconds using the sleek new menu system.

See for yourself why FormTool Gold has earned a place in the Software Hall of Fame.

FormTool Gold

BBR1020 **FormTool 3.0** 5¼" & 3½" **$79.00**

IBM PC, XT, AT, PS/2 or compatibles with 265K. Floppy or hard disk, supports all color or monochrome monitors with or without graphics cards and virtually all dot-matrix printers, daisywheel printers and laser printers.

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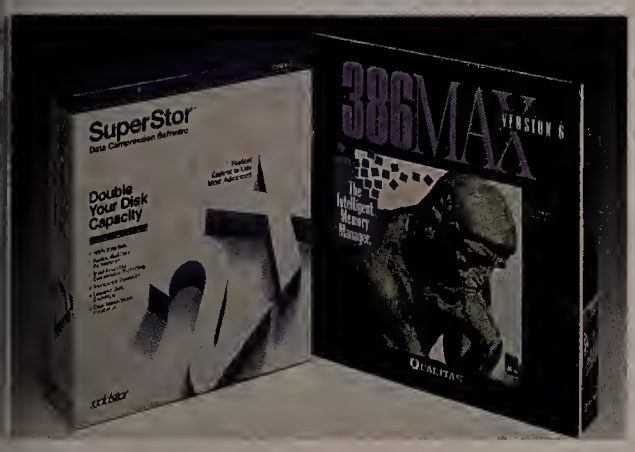
THE TIGER SUPER-UTILITY PACK!

FAST! is the brilliant caching system that actually increases the speed of your computer by up to 60 times! Simple to install, a snap to use, this software solution can make an XT with expanded memory outrun a full-blown 386! In tests, we loaded a 386 with FAST! and we almost blew the doors off the lab! (Keep reading for complete details on the head-to-head lab speed tests.)

On a standard data transfer performance test, FAST! is 18 times faster than a standard AT — and 5 times faster than the leading competitor. In fact, an IBM XT with FAST! is faster than a Compaq DeskPro 386!

SOFTWARE CAROUSEL!

Imagine switching programs on your computer as quickly and easily as you change channels on your TV! No more 10 step routines just to exit one program to work in another. Just switch and you're in your spreadsheet for work on the budget. Switch — you're in your word processor to zip off a memo. Switch over to your database to add items to your mailing list and then just switch back to your spreadsheet — to the exact spot you left off!



DISK OPTIMIZER!

Fragmentation kills hard disk performance. It causes excessive head movement across the media, creating bad spots throughout the drive. A fragmented hard disk, left unmaintained, is almost certain to crash. That means major data loss. Disk Optimizer 4.0's easy-to-use menus makes maintenance simple.

SUPERSTOR!

This unique product, unlike conventional file compression software, employs sophisticated "on-the-fly" compression algorithms to expand the storage capacity of your drives (hard disk or floppy) by up to 300% — and in many cases more! You can store 2 to 3 times more on your hard drive without giving up speed with this new technology... old technology gives up speed to get space.

386MAX New 386MAX is the best memory manager on the market today. Because it recovers massive amounts of high DOS memory and does a *better* job of freeing conventional memory with advanced tools like these:

- **ROMsearch**™ reliably recovers huge holes of unused system BIOS.
- **VGAswap**™ provides more contiguous memory by automatically relocating video ROM on all EGA and VGA systems.
- **Maximize Reordering** automatically optimizes the loading of programs into high DOS.

PC^R^X PC^R^x is the perfect anti-virus solution for notebook computer users or if you're computing in a Lan environment. The secret is a compact, 10K TSR filter that creates a virus behavior rule base which monitors virus characteristics and infection mechanisms, so PC^R^x predicts every possible move a virus can make before it infects!

PLUS, a last minute addition! THE NORTON BACKUP — The industry's most respected data protection product from Symantec. It automatically schedules backups and includes Norton Backup for Windows. Norton Backup is lightning fast, handling 3.5 Mb per minute. So automatic — just 3 keystrokes is all it takes!

ALL 7 TITLES—JUST $119.95

TIGER SUPER-UTILITY PACK	
BBR5495-5 **Tiger Super-Utility Pack** 5¼"	**$119.95**
BBR5495-3 **Tiger Super-Utility Pack** 3½"	**$119.95**

Shipping $10.95 on this bundle.

PC-To-PC File Transfers (DOS And Windows!)

REVIEWER'S NOTEBOOK: *Two innovative and highly superior products will be reviewed here from East Coast Software. These two products will definitely put them on the map as developers of fine utilities, exceeding the performance of competitors right out of the gate.*

WinLINK. *The first, WinLINK, is a remarkable file transfer and disk management product that runs under Windows and allows lightning fast, 100 percent reliable transfers for any DOS or WIndows application. The fastest laptop to desktop PC connection and transfers we've seen. With WinLINK, you can smoothly move, copy and update files between any two PCs with a Windows and a DOS text mode interface that are completely compatible with each other. Amazing new technology allows the entire contents of a directory or disk drive to be AUTOMATICALLY synchronized, copying new or modified files in either direction. WinLINK's high-speed parallel mode files are transferred between PCs in just seconds, rather than the minutes it would take with other products. There's an interesting feature known as "Data Equalization" that automatically updates files between laptop and desktop PCs. WinLINK also includes Lap2Desk, which allows virtual bi-directional access to all drives, makes remote drives fully available as local drives and allows printer-sharing between PCs. It's a great little bonus that's yours absolutely free..*

Lap2Lan. *The second entry from East Coast is Lap2Lan, another great new idea that gives your laptop or notebook PC full access to your network. Just attach your laptop via parallel cable (that's all it needs to work!) and your laptop is instantly connected to any networked PC — sharing its card. Lap2Desk (also included) allows your laptop to use data on the desktop in Windows or DOS. It actually is a two-PC network with full sharing of facilities. Home users, or anyone with two PCs will love this exciting new technology. No need for specialized pocket adaptors or expensive network cards. And Lap2Lan works with any Novell network; connect to Ethernet, Token-ring, ArcNet or any other popular network standard.*

High Speed File Transfer

DOS to Windows? Windows to DOS? No problem with WinLINK. A quick, simple connection allows you to transfer files of any platform in any direction with guaranteed compatibility. You see right on your screen a representation of two PCs linked through a parallel or serial connection. Here's a rundown of the incredible features of WinLINK.

- Full Microsoft Windows and DOS text mode interfaces provided — both fully compatible.
- Equalize feature for automatically updating files between your laptop and desktop PC.
- Full mouse support with object drag and drop.
- High speed (8-bit) mode for fast file transfer.
- Simple to use pull-down menus, overlapping windows, pop-up screen messages and point and click command execution in DOS and Windows modes.
- Remote installation for connection to PC with an incompatible or absent floppy disk drive.
- Active background operation in the multi-tasking MS Windows environment.
- Tree viewing mode, as well as linear directory mode, for easy examination of directories, subdirectories and files.
- Local transfer of single files, files matching specifications (such as name, time and date), tagged files, disks and directories.
- Local to local PC and remote PC directory management and file manipulation facilities.
- Integrated file viewer to check file contents.
- File, directory and disk comparison facilities.

Lap2Lan

This product is totally unique. Now, your laptop can have full and independent access to your network. Here's a rundown of the technical specs on this exciting new title.

- Supports all topologies (Ethernet, ArcNet, Token-Ring etc.)
- Eliminates the need for pocket adaptors or special network cards.
- Installs in seconds.
- Provides separate connection to your network.
- No expansion slots used.
- No network cabling required.
- No power supply required.

Competitive Upgrade Available

If you're using another file transfer utility, you are eligible.

WINLINK	
BBR3290 **WinLINK**	**$119.00**
BBR3291 **WinLINK Competitive Upgrade**	**$49.95**
BBR3293 **Lap2Lan**	**$119.00**

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The First Piano That Teaches You How to Play!

The Miracle Piano Teaching System Uses a Macintosh Or A PC To Teach Anyone To Play!

I remember being forced into taking piano lessons as a kid. My piano teacher, Mrs. Reymer, was sort of a crabby woman who'd smack my hands with a ruler when I missed a note. During my lessons, fun was the furthest thing from her mind. The repetition, the drills — I eventually quit and I've regretted it ever since. If she had injected a little fun into those lessons, I'd be on tour with The Rolling Stones today!

Now it's my turn to decide on piano lessons for my own kids. I introduced my nine-year-old, a self-proclaimed Nintendo master and junior PC hacker, to the Miracle Piano Teaching System about four months ago. His first question was "How do I fire the weapons?" Wise guy.

I left him alone with the Miracle and waited to hear something. Ten minutes later I heard Mary Had A Little Lamb, then Chopsticks and then the theme song from The Jetsons. I rushed back to his room and found him with that look on his face — the same look he gets when he reaches a new level in Zelda.

I saw that this thing really works. Today, he's writing his own tunes and getting better each day. He's enjoying music, he doesn't get hit with a ruler and all I have to do is encourage him.

The Only Self-Teaching Piano.

The Miracle Piano Teaching System can teach anyone — child or adult — to play the piano with a series of progressive, customized lessons. The Miracle quickly connects to a Macintosh or PC and includes software cartridge that combines an advanced MIDI keyboard with full-stereo sound and brilliant on-screen graphics. In no time at all, students of all ages will learn and perform left and right handed melodies — while having a lot of fun!

There are exercises, musical pieces and drills (cleverly disguised as games), that teach hand positions, notes, fingering, rhythm, scales and more. The Miracle can be quickly set up for any age or expertise, and customizes itself to move the user along at a comfortable pace.

Unlike conventional piano lessons, The Miracle eliminates boring, repetitive routines. The super-creative, artificially intelligent software quickly teaches the basics and builds on them in very entertaining ways. And that makes all the difference.

The Keyboard.

Dazzling music! Spectacular effects! Booming orchestras — all created by you — the Miracle keyboard — and a NES. As a stand alone instrument, The Miracle rivals the music industry's most sophisticated MIDI consoles. The 49 full-size keys are velocity sensitive, so you can learn to play utilizing true piano expression. You also get a foot pedal, which controls the length of time each note is sustained and stereo earphones.

The Miracle can produce sounds from its library of over 100 instruments, sounds and effects programmed by a leading motion picture sound designer. To produce its superior acoustics, the Miracle uses sampled sounds, it can be connected to a home stereo system for rich, full sound.

It's Not Just For Kids!

The Miracle is a lot of fun and kids all over the world are entering the world of music because of it. But it's not just for kids. The fact is, The Miracle is a breakthrough step in piano self-teaching. If you're an adult and would love to play piano (but think you're too old to learn), The Miracle can teach you with as little effort as it teaches the youngsters. And you'll enjoy it just as much!

FREE WITH THE MIRACLE

Miracle Song Collection Volumes 1 and new Volume 2, TRAX MIDI Recording Studio and the Miracle Stand pictured above.

FIRST TIME ANYWHERE!

MIRACLE FOR THE MAC

TIGER'S GOT IT IN STOCK, READY TO SHIP!

ALL-NEW PC VERSION! INCLUDES FREE HEADPHONES!

MIRACLE

BBR3776D	**Miracle for PC** 5¼" & 3½"	**$399.00**
BBR2776	**Miracle for Mac**	**$349.00**
BBR3781	**K-5 Carrying Case**	**$39.95**

THE SHARP WIZARD VS. NOTEBOOK PC

Pick up any magazine and you'll see pages and pages of advertisements and reviews on Laptops and Notebooks. They sport all kinds of bells and whistles, come with tons of software and promise all the functionality of a desktop PC. And that's great.

But if you talk to people who actually buy and use Notebook, they'll tell you that while it's extremely cool, it's more computer than they really need when they hit the road. Let's face it, using a Notebook to retrieve phone/FAX numbers, price lists, appointments, to do lists, birthdays and flight arrangements is overkill. What you really need is a Sharp Wizard 8000 (or its bigger brother, the 8200, pictured below). Small, compact, without the inconveniences of battery recharging, The Wizard 8000 has everything road warriors need: scheduler, word processor, spreadsheet, city guide — even games! Its built-in applications are extremely easy to learn and use. And it fits in your pocket! Notebook users are turning to Wizard for INSTANT retrieval of names and numbers. The Notebook can't do that...

Designed to Do What Your Notebook Can't.

The Wizards from Sharp are sophisticated, powerful computers designed specifically to organize all of your personal information. Whether you're jotting down names, numbers and expenses or creating 3-D charts and downloading spreadsheets. Its power has been allocated to fast, easy collection, storage and retrieval of anything. The Sharp Wizard delivers the ultimate in portability.

The Wizard focuses on the fundamentals. Like an extra wide, super-crisp screen which allows an impressive 40 character by 8 line view. The display is the single most important feature in any small computer, and nothing I've seen compares to the Wizard. I love the way each key is exactly where you'd expect it to be. Search with one stroke, perform any task by just touching an icon.

I've been using a Wizard OZ-8200 for a number of months now, and I can tell you that it fills a big need in my business life. I used to carry a Notebook and quickly realized that I spent too much time babysitting the thing, along with all of my programs, files and diskettes. What I needed is something much smaller and lighter, yet fast and powerful. I carry my Notebook sometimes — but my Wizard is always with me. Unlike my Notebook, which requires booting-up, opening a word processor or note pad, the Wizard requires just one keystroke.

With the software now available for the Wizard, I can run spreadsheets, create finished documents, organize my expenses, communicate with my desktop back at the office or my PC at home — even send faxes and play a few furious rounds of Hatris or Box Jockey!

SHARP WIZARD

BBR6310	**ZQ-5200 Sharp Wizard**	**$199.95**
BBR6311	**OZ-7200 Sharp Wizard**	**$239.99**
BBR6312	**OZ-8000 Sharp Wizard**	**$299.99**
BBR6309	**OZ-8200 Sharp Wizard 128KB**	**$399.99**
BBR6313	**Organizer Modem**	**$179.99**
BBR6314	**Organizer Talk** (OZ-7000 series only)	**$99.99**
BBR6315	**Organizer Fax/Modem**	**$499.99**
BBR6320	**Time Expense Manager**	**$119.99**
BBR6321	**Dictionary/Thesaurus**	**$129.99**
BBR6322	**8 Language Translator**	**$99.99**
BBR6323	**Money Planner**	**$99.99**
BBR6324	**Spreadsheet II**	**$179.99**
BBR6325	**Scientific Computer Card (7000 series)**	**$109.99**
BBR6317	**Scientific Computer Card II**	**$109.99**
BBR6326	**North American City Guide**	**$79.99**
BBR6330	**Box Jockey**	**$49.99**
BBR6331	**Organizer Chess**	**$109.99**
BBR6332	**Tetris Game** (7000 series only)	**$49.95**
BBR6318	**Hatris Game** (8000 series only)	**$49.95**
BBR6319	**Backgammon Game** (7000/8000 series)	**$49.95**
BBR6333	**Organizer Bible**	**$149.99**
BBR6340	**Portfolio Card**	**$129.99**
BBR6341	**32K RAM Card**	**$79.99**
BBR6342	**64K RAM Card**	**$129.99**
BBR6345	**128K RAM Card** (7200/8000/8200)	**$149.99**
BBR6346	**Mac Organizer Link**	**$109.99**
BBR6347	**IBM Organizer Link II**	**$129.99**
BBR6350	**Leather Case (OZ-7000 series)** *(Reg. $34.99)*	**FREE w/OZ-7200**
BBR6351	**Leather Case (OZ-8000 series)** *(Reg. $34.99)*	**FREE w/OZ-8000 or 8200**
BBR6399	**Video Guide** *(Reg. $34.99)*	**CALL!**
BBR6352	**Battery Pack (for OZ-8000 series)**	**$34.99**
BBR6353	**Printer**	**$169.99**
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Virus Protection Used by Law Enforcement Officials.

It Takes Software AND Hardware for Total Protection. NEW Version 3.0!

What kind of a person would create a computer virus and attempt to spread it to other computer users via diskette, LAN or bulletin board? Why would an individual intentionally want to wipe-out an innocent PC user's hard disk to the point of absolute system failure? It makes you wonder... I believe that it's one of the most costly crimes in America. A well-placed virus can strike with devastating force and uncontrollable speed, leaving damaged equipment and lost data in its ugly wake. I know; we've survived a virus attack here at Tiger. Many of our records were lost. We had to completely re-load our PCs from the operating system up. People stood around, unable to do their jobs, orders went unfilled, customers didn't get answers to their questions. It cost us plenty, and we looked for a way to prevent it from ever happening again. We've found the answer — and now this remarkable system is available to TigerSoftware readers at an affordable price. It's called PC-cillin and it combines proprietary hardware with maximum-strength virus fighting technology for complete protection, far beyond the capability of any other system.

The secret is PC-cillin's hardware AND software approach to anti-viral protection. It comes with a unique Immunizer Box that attaches to the back of your PC in less than a minute! Hardware and software, working together, can isolate viruses BEFORE they infect — software can't — to deliver 100% foolproof virus protection.

The Only Total Solution.

But the Immunizer Box does still more. PC-cillin also does a regular self-check to ensure it remains free from virus infection. If the self-check indicates an infection has occurred, a clean copy of the PC-cillin file is generated. There's no way a virus can launch an attack.

Stealth Viruses.

New Generation or 'Stealth' viruses are the latest creations of warped minds somewhere. They bypass the calls that DOS itself makes, and are thereby undetectable by the standard anti-virus programs. PC-cillin assures total protection with 12 unique viral "traps". PC-cillin searches for 'characteristics' of a virus, in addition to the standard before-and-after data checks, and also uses scanning comparisons for known viruses. This feature assures protection against future viruses so frequent updates are not necessary with PC-cillin (unlike scan products). PC-cillin is the last virus protection you'll ever need.

Government Infiltration.

What do the U.S. Air Force, U.S. Army, U.S. Navy, and the U.S. Post Office all have in common? When they look for virus protection — they look to PC-cillin. A government agency recently became infected with a virus and called in the anti-virus heavyweights to bail them out: PC-cillin, Norton Utilities and McAfee's Viruscan. Viruscan 'blew up' in the middle of checking a file. When Norton Utilities began to attack the virus, the virus attacked back! Only PC-cillin was able to destroy the virus once and for all.

CALL NOW AND SAVE $30.00!
Regular $129. Order Now—Save $30!

ALSO AVAILABLE: PC^{R}x The Ideal Anti-Virus Software For Your PC/Lan.

The researchers at Trend have just released PC^{R}x, a new anti-virus product with the same powerful level of virus protection found in PC-cillin. Like PC-cillin, this new software product provides continuous virus protection at an affordable price. PC^{R}x is the perfect anti-virus solution for notebook computer users or if you're computing in a Lan environment. The secret is a compact, 10K TSR filter that creates a virus behavior rule base which monitors virus characteristics and infection mechanisms, so PC^{R}x predicts every possible move a virus can make before it infects! Even treacherous new strains are instantly spotted and conveniently removed with PC^{R}x.

PC-cillin & PC^{R}x

BBR4010	**PC-cillin** 5¼" & 3½"	**$99.00**
BBR4011	**PC^{R}x** 5¼" & 3½"	**$59.00**

Automatically Turn On Your PC By Modem!

REVIEWER'S NOTEBOOK: *This best-seller is a must for anyone who uses a computer on the road or at home, as well as the office. With the price of pocket-sized, very fast modems coming down, remote computing is becoming a business standard. Now you can call from any phone and turn on any remote computer (or any other equipment), without the wear and tear or maintenance cost of leaving the equipment running full time.*

With pcAnywhere, Carbon Copy, Commute or any other remote communication software you'll have total control over your remote computer. Then, when you hang up, the equipment is turned off — all remotely and automatically.

Remote Power On/Off works like this: Just connect the Remote Power On/Off unit to your office PC. Then, from your home or remote location, actually turn on the office PC and begin work. With remote communication software, you can access and use software applications, perform lightning fast data transfers, even use printers and other peripherals connected to the office PC. And here's the enormous benefit: the office PC does not have to be running 24 hours a day. You'll see significant savings in energy costs (estimates suggest that running a PC and laser printer 24 hours a day can cost an extra $50 each month) and over time, you'll reduce wear on the equipment.

Network An Office In Less Than An Hour!

No Experience Required! Share Printers, Send Messages and More.

Easy Office Network makes connecting PCs as easy as plugging in a new phone.

It seems everyone wants to connect up their computers lately. Being able to share an expensive laser printer or a high-speed, costly modem is a big money-saver. Not to mention the increased productivity gained by sending electronic messages between PCs. Then there's the advantage of quickly and easily transferring files. (What's worse than having to transfer a file too large to fit on a disk?)

Reap the benefits of networked computers without the little-known hassles. Expensive networks like Novell require expert (read in "high-paid") technicians to do the simplest of everyday tasks. And big networks require special versions of your existing software. (That's a big hidden cost — new WordPerfects, 1-2-3s, etc.) You could spend thousands of dollars to connect just a handful of PCs.

But with Easy Office Network, there's nothing extra to buy. Everything you need — cables, connectors, etc. — comes complete in one easy-to-use package. Anyone can quickly install Easy Office Network. It's as simple as plugging in a telephone. (In fact, they use the same kind of wire and plug.) After one fast, initial installation, Easy Office takes care of itself with no further attention from you. You'll be reaping the benefits of networking — without the hassles!

- **Share Serial and Parallel Printers with Disk Spooling.**
- **Share Expensive Modems.**
- **Send Messages Between PCs.**
- **Run Remote Applications.**
- **Transfer Files Between PCs.**

When you throw in password security, file locking, and a host of other features, Easy Office Network becomes a vital business solution.

Start with the 4-PC or 8-PC kit, then add on when the need arrives. Multiple Easy Office Networks easily link together to support 16, 24 or 32 PCs. And don't worry about memory — Easy Office Network uses only a scant 48k.

All you do is plug the Easy Office Network connector into the serial port (which every PC has), and run the simple installation program. No boards or other hardware to install. No expansion slots taken up, and no conflicts with other boards. This product really lives up to its name: Easy.

SERVER TECHNOLOGY

BBR6300	**Remote Power On/Off**	**$149.95**
BBR6301A	**Easy Office for 4 PCs**	**$399.95**
BBR6301B	**Easy Office for 8 PCs**	**$495.00**
BBR6301C	**Upgrade from 4 to 8 PCs**	**$229.00**

Remote On/Off: *IBM PC, XT, AT and compatibles with 256K RAM.*
Easy Office Network: *Requires 1 serial port for each PC.*

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Peer-to-Peer

LANs: Almost Plug 'n' Play

Has fear of complex LAN setup and administration kept your office in the dark ages? Then take the easy route with one of these flexible, serverless peer-to-peer LANs.

Everyone wants instant LAN gratification: Plug in the cables, load the network operating system (NOS), and start sharing files and printers. Easy, push-button networking may still be a few years away, but a good peer-to-peer NOS can take you close to that dream today.

Ideal for small businesses and isolated work groups, peer LANs let users access resources no matter where they are on the network. That way, you can put printers and data bases where they're needed most, better matching hardware to applications. Each user decides which data, applications, and printers to share with co-workers.

While Novell's justly popular server-based NOS's, NetWare 2.2 and 3.11, do provide peer-printer capabilities, the features are fairly inflexible, the implementation is slow (especially with 2.2), and resource sharing doesn't extend to data—you're limited to files located on a dedicated server's disk. You can buy excellent utilities that give you a full peer-to-peer tool kit, but this solution adds cost and complexity to already expensive, complex products.

BY ROBERT LAURISTON

Avoiding complexity is the chief idea behind peer LANs. The best are easy to install and simple to operate on a day-to-day basis. Unlike a NetWare LAN, which will probably require at least a half-time network administrator, peer LANs can run smoothly with minimal attention. Most work groups will want to assign a fairly technical type to install the LAN and update user and resource lists when personnel and equipment change, but this doesn't require special training. In fact, in many peer networks, there's no administrator—each user is responsible for sharing and accessing resources and updating lists, tasks that usually take only a few minutes a day.

Just as important for cost-conscious buyers, peer NOS's free you from a dedicated (and pricey) file server, such as you'd need with NetWare—and they are significantly cheaper in the first place. Moreover, with a server-based NOS, crucial network services disappear when the server goes down. But if one or more PCs on a peer LAN

ILLUSTRATION BY JEAN TUTTLE

fail, the network is usually unaffected.

As a rule, peer NOS's can run all the multiuser business applications that server-based NOS's can, and some of the latest packages have added security features that make program sharing easier and safer. Still, you shouldn't use a peer LAN to run multiuser data bases that hold vital company data—accounting and inventory programs, for example. For such tasks, dedicated NetWare servers provide much greater data safety—and they also run multiuser applications more quickly.

Fortunately, this is no longer an either-or proposition: Three of the five NOS's in this review can coexist with NetWare. That means you can access a group data base on a NetWare server while sharing your co-workers' printers and files, gaining both the convenience of a peer LAN and the data integrity of a server. For details on how this works, check out the sidebar "To Peer or Not to Peer."

Running two NOS's simultaneously is more workable than you might think. Until recently, one of the major issues in choosing a peer NOS was memory overhead—some network drivers gobbled so much RAM you couldn't even load *WordPerfect*. But with the arrival of DOS 5.0, RAM cram has become a non-issue. On a 386 or 486 system, DOS 5.0 can load network drivers into high memory, leaving almost all your base memory free for applications. Third-party products such as *NetRoom*, *QRAM*, and *386Max* do the same for 286 systems.

Picking the Top Five: Compatibility is the Key

We used three basic criteria in selecting products for this review. To avoid tying you to a single hardware vendor, we made sure that all the NOS's here run with the commonly available ethernet boards from Standard Microsystems,

Buying Smart: Searching for the Peerless Peer-to-Peer

There are plenty of good reasons to network your work group. While laser printers are no longer prohibitively expensive, it's a lot cheaper to share a few of them via the LAN than to put one on every desk. Another boon is E-mail, which can make telephone tag a game of the past. Shared data bases can replace Rolodexes, keeping everyone in the office up to date on new customers and changes of address. A good peer-to-peer LAN is the easiest way to get all those goodies—if you know what to look for.

EASE OF USE

The ideal peer-to-peer network operating system (NOS) doesn't call attention to itself. Changing your drive mappings and printer connections, or checking a queue to see if your print jobs are done, should take no more than a few seconds.

The NOS should let you browse resources from a simple display (usually a scrolling list or a directory tree) that lets you find what you want quickly. Commands should take only a few keystrokes or mouse clicks and should be clearly explained by on-line help. Best Buy *LANtastic* takes the honors for ease of use.

ADMINISTRATION

For most people, the whole point of peer-to-peer is that no administrator is required. Once your boards and cables are installed, setup shouldn't take more than an afternoon, and maintenance should consume only a few minutes a day.

You'll have to place the network software on each workstation, so automatic installation is paramount. For each workstation, you shouldn't have to answer more than a few simple questions about which local drives and printers you'd like to make available to the network—and which remote resources you want to link to at start-up.

It's helpful to be able to change network defaults, create log-in IDs, and so on from any workstation. If the NOS lets you assign security rights to users or groups, it's much better if the user and group names are automatically sent to the whole LAN. Otherwise, you have to create IDs for new users at each workstation. *10Net*, *LANtastic*, and *NetWare Lite* are tops at administration.

RESOURCE SHARING

Every peer-to-peer NOS lets you access shared data and applications on remote drives, and they all let you print jobs across the net. Only *LANtastic* has a modem-sharing option.

The NOS's vary, however, in the flexibility their users have in sharing those resources. For example, if you change your links to remote drives and printers during a work session, a good NOS will let you save these new connections to your default configuration. Automatic reconnection reestablishes your links after an interruption—a big time-saver if PCs in your work group tend to crash often.

Synchronized start-up is also important: When you turn on your workstations in the morning, the NOS should give each user the option of waiting for a station that hasn't connected or skipping it temporarily. Ideally, the NOS would keep trying to connect, in the background until it made the connection—but none currently do this. Finally, it's helpful for a NOS to provide a memory-resident pop-up so you can access network commands and print queues from within any application. Best Buy *LANtastic* delivers almost every resource-sharing feature you'd want.

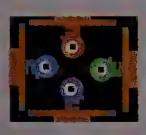
Novell, and 3Com. (This eliminated Grapevine's *GV LAN OS*, D-Link's *LANsmart*, and DacEasy's *MainLan*, which work only with those companies' own boards.) We also chose only products that work hand in hand with DOS (disqualifying Hayes's *LanStep*, which requires you to reformat your hard disk to create a special non-DOS volume).

Finally, we demanded *Windows* compatibility—simply meaning that the network driver and *Windows* will coexist without conflict. All these NOS's work with *Windows*—but not all have a *Windows* interface and network driver. Without those utilities, you'll have to run a character-mode DOS utility for tasks such as checking a print queue.

Which peer NOS is best for you? Our Best Buy—Artisoft's *LANtastic*—is the easiest to install and use, and it has the best *Windows* interface. Its only serious challengers are Sitka's *10Net* and Novell's *NetWare Lite*. *10Net* boasts a raft of impressive security features—but its user interface (especially its *Windows* module) needs some work. Frankly, we expected the new *NetWare Lite* to give *LANtastic* more of a run for its money—its easy installation and server-type supervisor option make it a good value, but this first release is missing some important security features.

Eventually, peer-to-peer LANs may disappear as a product category: Microsoft has announced plans to build basic peer LAN skills into future releases of DOS and *Windows*. That could take a while, however. In the meantime, the best of these peer NOS's will give you a taste of tomorrow's effortless networking today.

Robert Lauriston is a contributing editor for PC World *and editor of* The E-Mail Update. *He can be reached on PC World Online (see page 8 for more information).*



MULTIUSER SUPPORT

Traditionally, peer LAN users haven't cared much about security—they simply shared data and printers and kept private files hidden. But as peer LANs become more powerful and compete against server-based LANs, security has become more important.

The capability to make files available to some users but not others is key. At the least, you should be able to assign rights (access, read, read/write, and so on) by user, but it's more important, especially in larger groups, to assign rights by groups. For instance, if you want your accounting files to be restricted to bookkeepers, create a Book group and assign it rights to the accounting files' directory. When you hire bookkeepers, you add their names to the group to give them rights to the files. Without groups, you have to add a new bookkeeper's name to every shared resource individually. If you can't assign either user or group security rights, you need a separate password for every directory you want to protect. Such passwords often end up on Post-its stuck to people's monitors, and so much for security.

Rebooting a PC can wreak havoc on co-workers who are accessing its hard disk—it may even trash their data—so it's crucial that the NOS intercept <Ctrl>-<Alt>-<Delete> and ask you to confirm that you want to reset your PC.

All the NOS's provide simple station-to-station messaging. *LANtastic* has a simple file and voice transfer capability, and *PowerLan* gives the first eight users full-fledged *cc:Mail*. We add points for NOS's that can coexist with NetWare. Once again, Best Buy *LANtastic* offers the most impressive multiuser support.

WINDOWS SUPPORT

All the NOS's are compatible with *Windows*, but some are slicker about how they do it than others. With Microsoft's GUI growing ever more popular, a *Windows* control panel is a big plus, so you won't need to switch to DOS every time you need to attach to a new printer or drive. *LANtastic*'s *Windows* tools are tops.

SERVICE AND SUPPORT

With each of these NOS's, we needed at least a little phone help to get everything running just right. To test technical support, we called each vendor three times, asked questions of varying technical complexity, and noted the timeliness and accuracy of the answers. We factored in support policies like cost, hours, toll-free lines, and BBS and fax support. *Invisible Network for Windows AI* gets our vote for best service and support.

PRICE

NOS pricing is complicated: Some programs charge a flat rate per LAN, others charge x amount per user or station, and a few give you a discount when you buy y copies at the same time. The "cheapest" NOS depends on how many stations you buy—but they're *all* a lot cheaper than NetWare. The most expensive lists for only $150 per workstation, and street prices are even lower. In contrast, for server-based LANs of 5 to 20 users, NetWare 2.2 averages $235 per node, plus $3000 or $4000 for a dedicated server, and the state-of-the-art NetWare 3.11 costs even more. To calculate an overall price rating we average the cost of one 20-user, two 10-user, and two 5-user LANs.

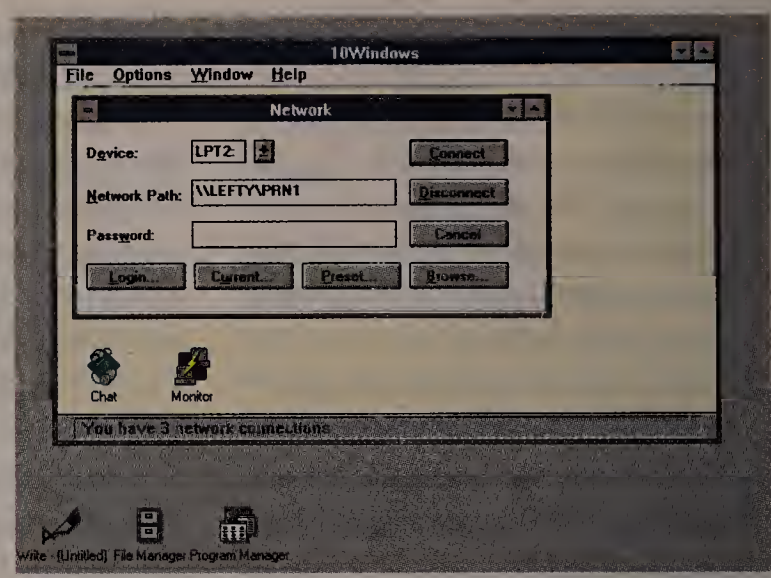
10Net 5.0

PROS: Strong security, easy installation, low price **CONS:** No automatic reconnect, doesn't block <Ctrl>-<Alt>-<Delete>

WINDOWS If a package of powerful security features is a high priority, you may want to join the ranks of *10Net* users, which include the FBI and the CIA. Not only do you get good support for user groups (which makes assigning access rights easier), but it's the only peer NOS we've seen that lets you restrict access to selected subdirectories or files of shared directories. You can also set a directory so only one person at a time can modify its files, which helps prevent system crashes from corrupting shared data bases.

Installing *10Net* is a snap—and printer setup is particularly painless. One big plus is that you can optimize print sharing by queueing print jobs on one system and printing them on another. That sounds esoteric, but it means you can put a printer where it's most convenient, even on a cheap, floppy-only PC, and run the queue on a fast system with a fast processor and a big hard disk.

Despite these tasty touches, *10Net* comes up short in a few areas. Dialog boxes are poorly designed, with the commands you need first placed low on the totem pole. A host workstation (a PC that is sharing its files or peripherals) permits its user to reset the system using <Ctrl>-<Alt>-<Delete>, which could mean lost work for remote users connected to a host's resources. The lack of automatic reconnect compounds the problem: If you get booted off a remote system by a reset or a network crash, you'll have to reselect its remote drives and printers one by one from a menu.



10Net's Windows interface looks fine at first glance, but dig a little deeper, and things get confusing.

While Sitka's service and support policies are solid, its telephone techs were slow in responding to our calls, and the answers they gave us weren't always helpful. Despite these few flaws, *10Net* is a good value, especially for security-conscious users worried about the anarchic side effects of peer networking.

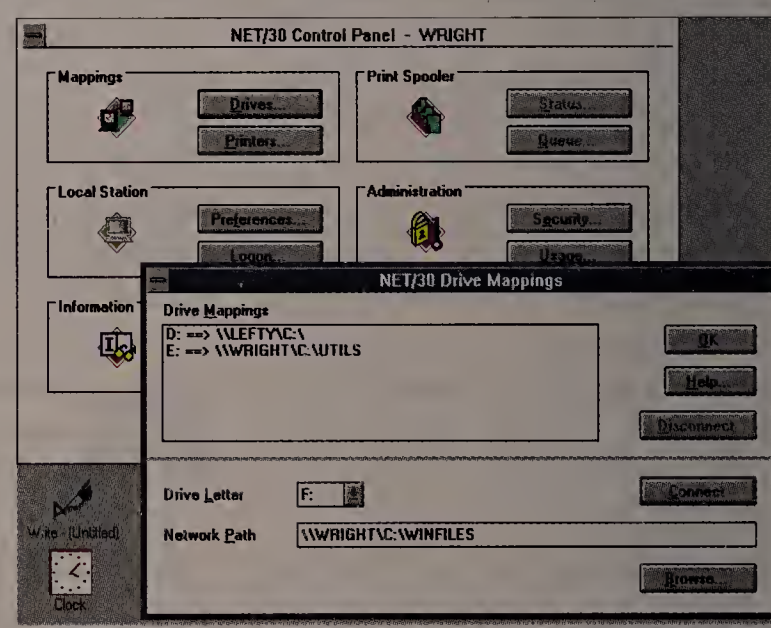
Invisible Network for Windows AI 3.0

PROS: Network bulletin board, user group rights, great service and support **CONS:** DOS users can't browse resources, awkward interface, fairly expensive

WINDOWS *Invisible Network for Windows AI* comes with one really nice feature: a built-in bulletin board for company notices and want ads. It also gives you reasonably flexible options in sharing resources and assigning rights. But there's some bad news, too: The prices are high, especially for larger groups; the NOS is confusing to install and fairly hard to use; and you're restricted to Novell and Invisible network boards.

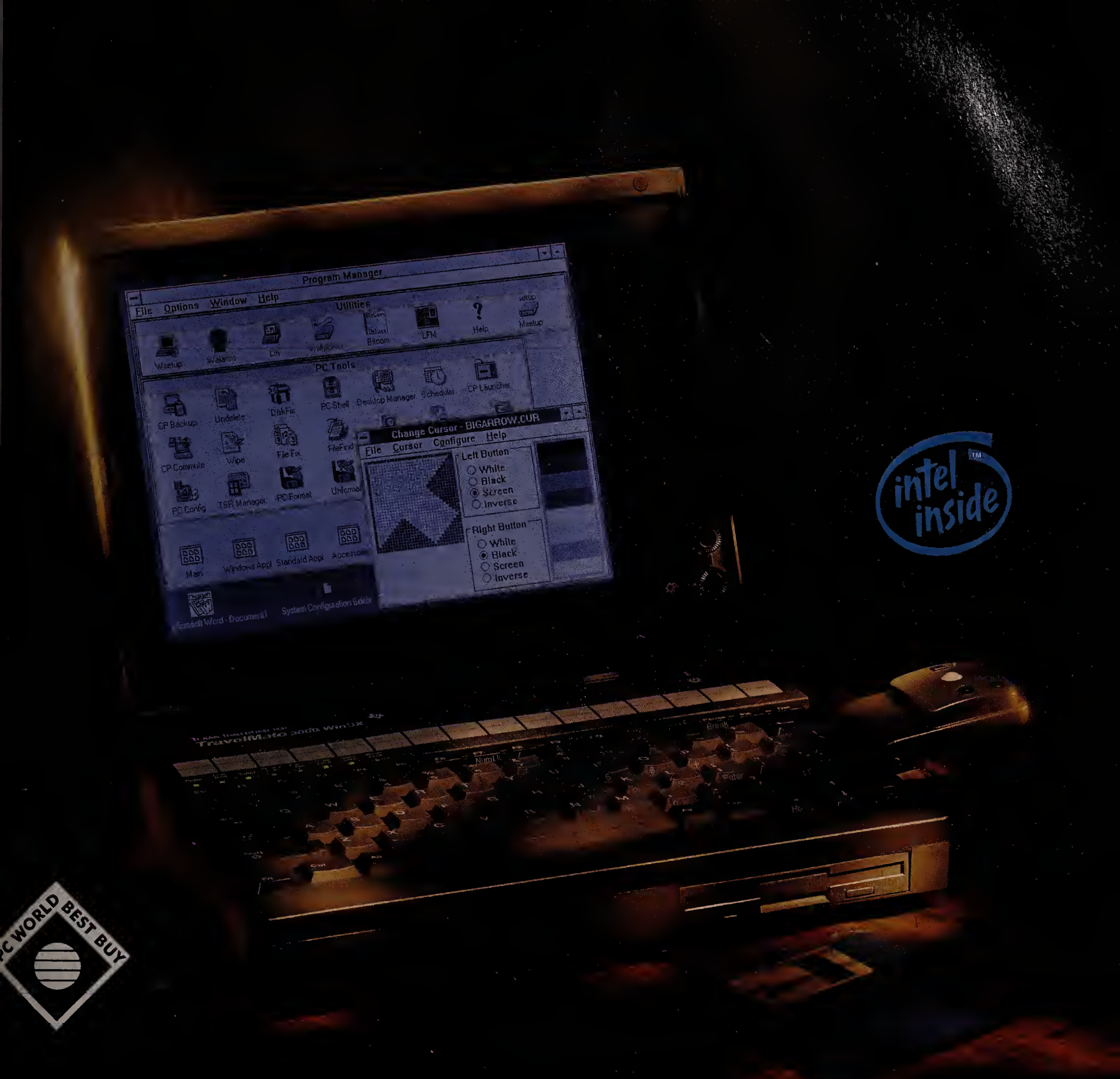
Installation is pointlessly complicated. You have to pore through the manual, step by step, to see what menu choices to select. Worse yet, some steps don't work as described. For instance, choosing 'copy files to hard disk' doesn't finish the job—you have to copy many files manually. Instructions on basic tasks such as configuring *Invisible* to work with DOS 5.0 and *Windows* are either missing or nearly impossible to find. Luckily the company's fast and friendly phone support takes up the slack.

Both *Windows* and DOS menus are clumsy. For instance, to connect with a remote resource, *Windows* users start by clicking on a server, which reveals a list of its shared resources. So far so good, but if the resource you want isn't on that server, you have to wait while *Invisible* rescans every available server on the entire LAN—which can take a long time. Under DOS, you can't browse the network at all. Instead, you must know the name of the server and resource and type the information in. DOS users are excluded from the bulletin board, and DOS-based network utilities don't come in RAM-resident pop-up versions.



Browsing resources with Invisible Network for Windows AI is awkward, and the NOS wastes time by repeatedly rescanning the network.

Invisible is a pretty good value for small *Windows* work groups, but not if you have a few stray DOS users in the bunch. And it's best if you have a knowledgeable administrator to install the NOS and help novice users maintain it.



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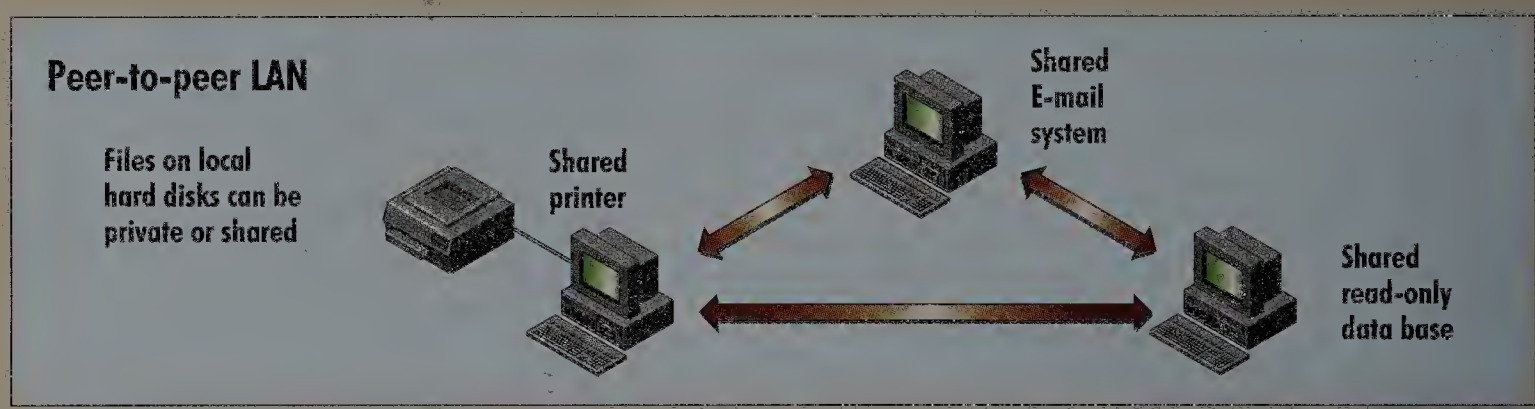
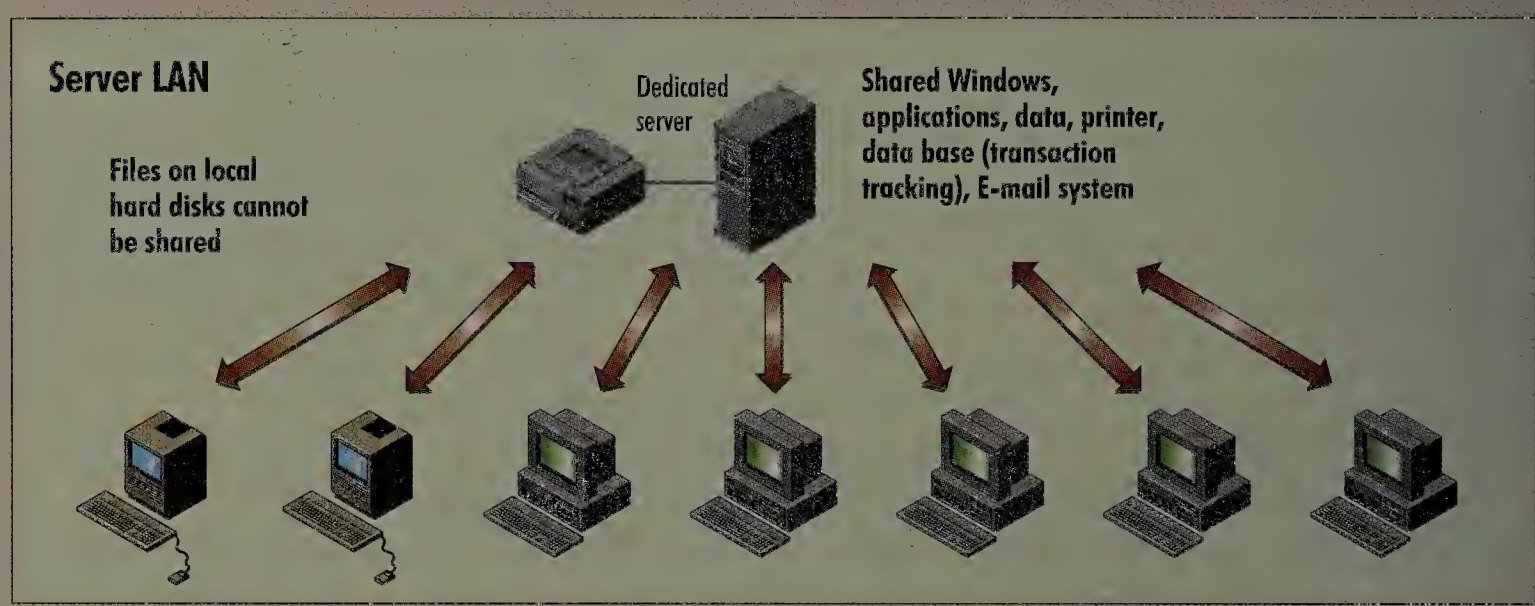
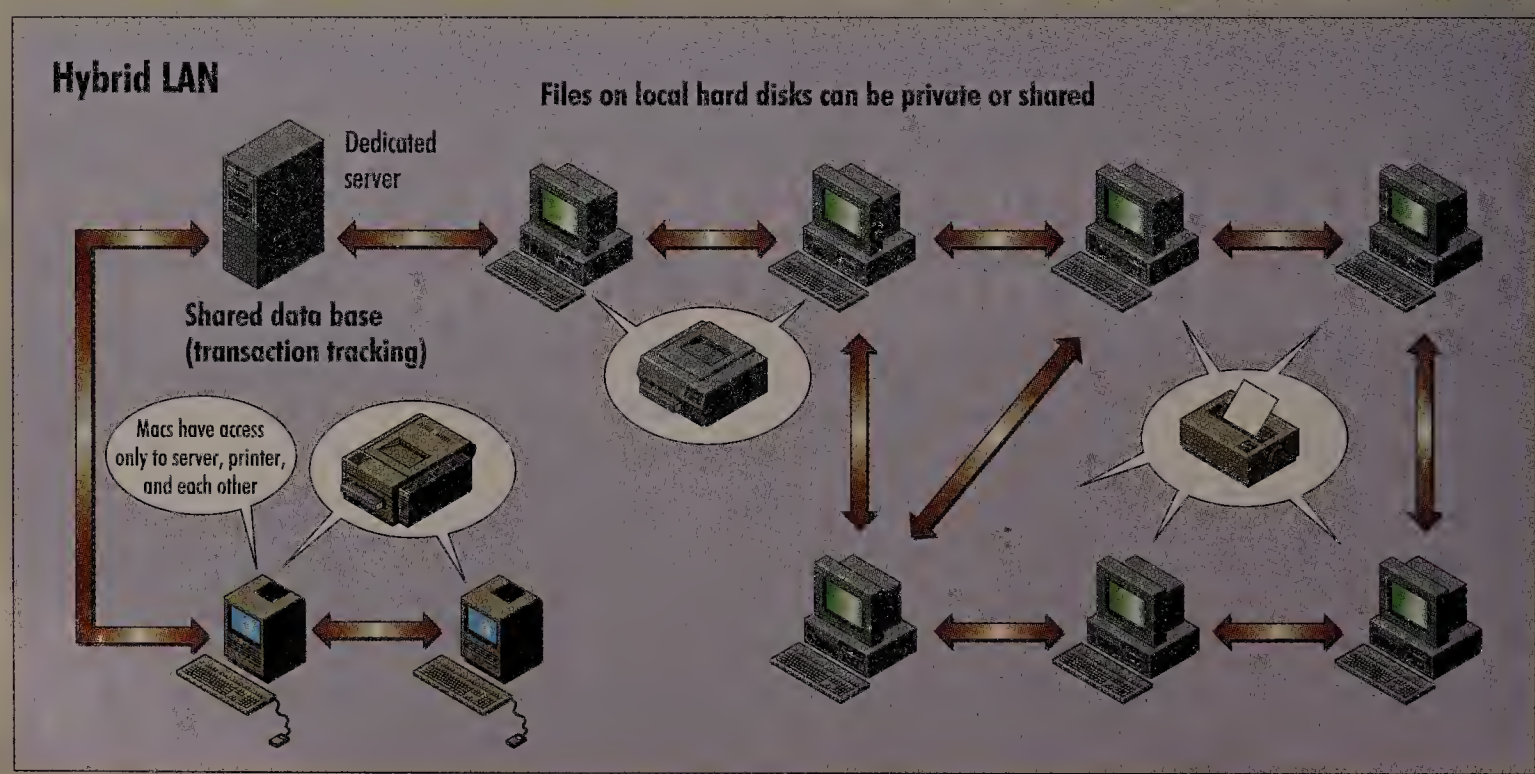
Circle 263 on reader service card

A Tale of Three Networks

Traditionally, you've had to choose between a peer-to-peer network, which offers flexible printer and file sharing, and a server-based LAN such as NetWare, which requires a central server and administrator but offers a better platform for sharing applications. Today, thanks to DOS 5.0's memory tricks and advanced peer-to-peer technology, you can run NetWare and your peer-to-peer NOS on the same workstations and get solid multiuser support plus simultaneous freestyle resource sharing.







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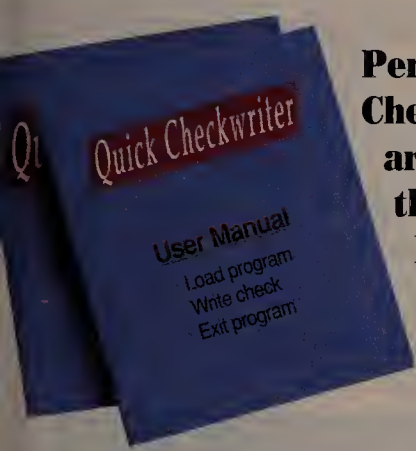

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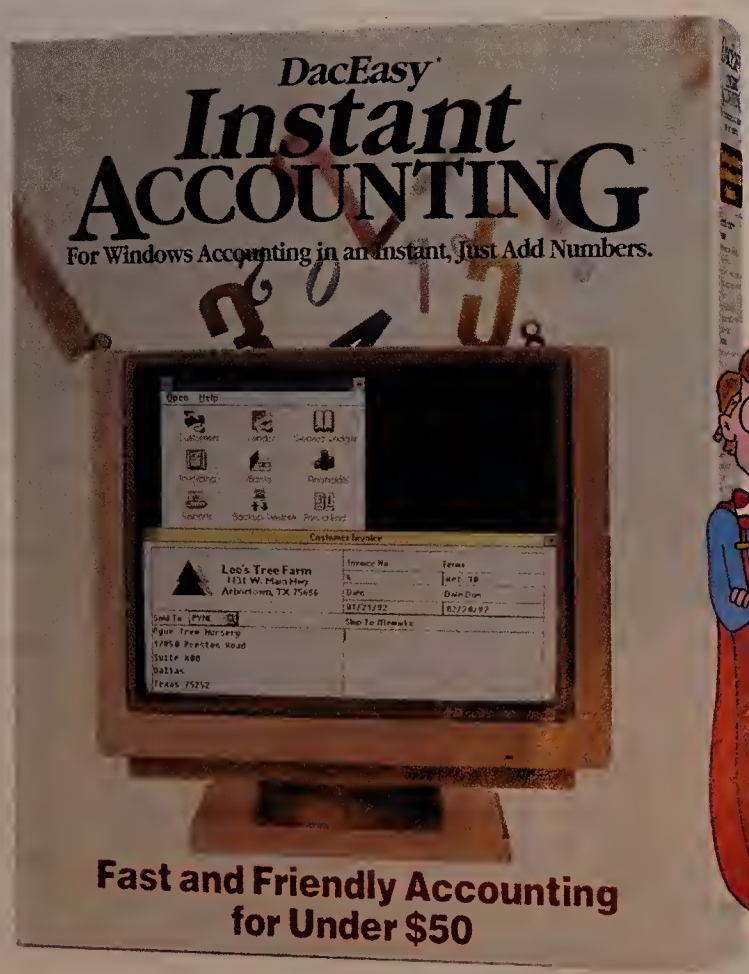

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Media Code: PCW

Hardware Requirements: IBM or Compatible PCs, 640K Ram (1 MB with Windows), a hard disk drive, DOS 3.1 or later, Windows 3.0 or later (optional). Monochrome, CGA, EGA and VGA monitors. Mouse optional.

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Circle 70 on reader service card

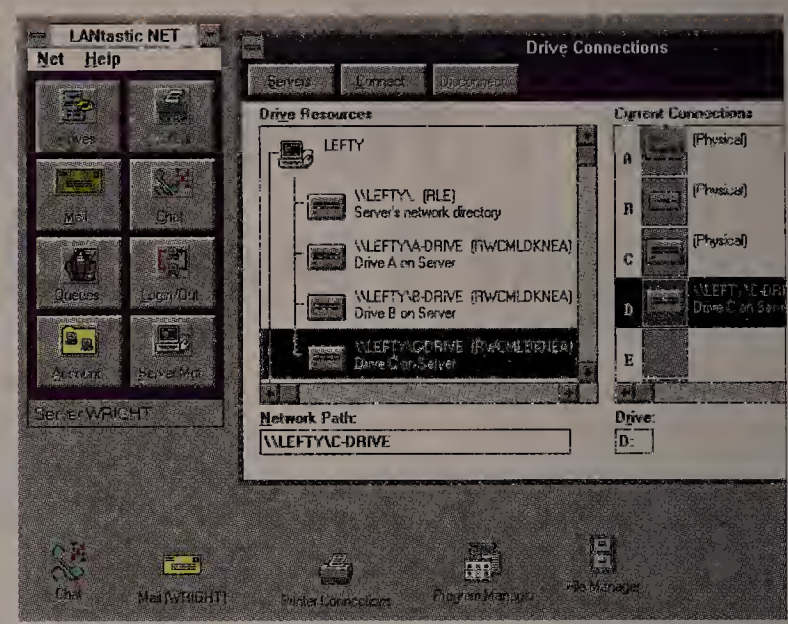
LANtastic A/I 4.0

PROS: Great Windows interface, flexible resource sharing, optional modem sharing, UPS monitoring support **CONS:** Awkward security procedures

WINDOWS In 1989, *LANtastic* won a *PC World* Best Buy for its strong feature set and minimal memory requirements. Today, even though DOS 5.0's ability to load a TSR into high memory has made RAM cram a thing of the past, *LANtastic* is still a Best Buy. It's the first peer NOS to offer a modem-sharing option, the first to let you transmit voice messages by LAN, and the first to support uninterruptible power supply (UPS) monitoring for safe shutdown after a power failure.

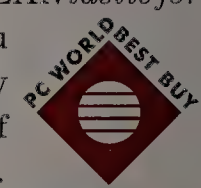
Installing *LANtastic* is virtually automatic, and its everyday use couldn't be much easier. A menu displays all the current assignments of available drive letters and printer and modem ports. Simply click on a drive letter, and up pops a list of servers; select a server to view a list of resources; select a resource, and you're promptly connected. This is exactly the way that a LAN should work.

Assigning security rights is a bit more difficult than it needs to be. You have to group users by their user names using wild cards. For instance, Sales-Smith and Sales-Jones would belong to the group Sales-*. This approach works, after a fashion, but it's not as useful as real user groups. In addition, Artisoft's telephone support is uneven. Mostly the help was fast and accurate, but sometimes the answers were just plain wrong.



Each of LANtastic's Windows utilities is a separate program, so you can leave frequently used modules running for faster access instead of turning them on and off.

LANtastic is a bit pricey for smaller *Windows* LANs, but if you don't need the *Windows* interface, the price is right—you save $299 per network. If you already have a NetWare LAN, you can add peer-to-peer services for a flat $499 per LAN by installing *LANtastic for NetWare*. That way you can have your Best Buy peer LAN and snack off your NetWare server too.

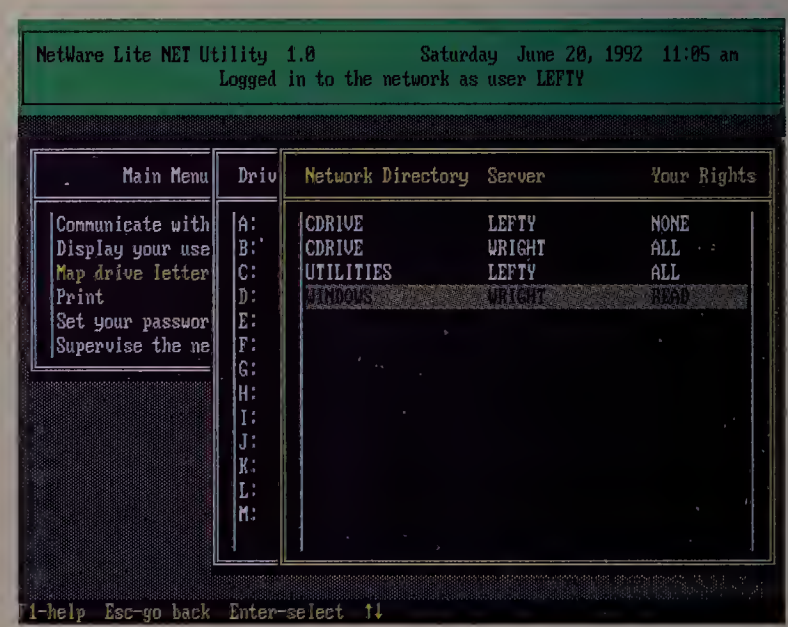


NetWare Lite 1.0

PROS: Easy installation, central administration option **CONS:** No Windows interface, can't save remote resource setup, pay-as-you-go phone support, 25-station limit

Novell's new peer NOS can't top *LANtastic*, but it's probably your best option if you like the idea of peer-to-peer flexibility—and prices—but don't want to surrender central control. *NetWare Lite* is the only program that gives you the option of letting a supervisor handle almost all administrative and user tasks. The program's distributed security data base makes the job a lot easier: You can define a user name at one station, and it will be copied automatically to all the others—avoiding the necessity of every user on the net adding the newcomer.

Lite is quick to install and makes hooking onto remote resources effortless. Although there's no *Windows* interface and its DOS interface isn't RAM resident, the menus are simple to follow. Naturally, *Lite* is designed to work well with NetWare, and if you *do* run into problems, having a single company to complain to should make troubleshooting simple. But unfortunately, Novell's pay-as-you-go telephone support is expensive. There's an 800 number, but you'll pay $20 per incident. Call the 900 number, and you'll pay $2 to $3 per minute.



NetWare Lite's DOS interface is simple and straightforward. All available network directories are shown in a single scrolling list, allowing you to point and shoot.

Even the knowledgeable Novell tech support won't be able to help you with some problems: The only way to load your network connections automatically at start-up is to write a batch file, and when a remote resource isn't available (for example, if a PC is turned off), *Lite* skips over it instead of waiting for it to come on line. Worse, *Lite* lacks user groups, which could make keeping track of a large LAN a chore.

NetWare Lite is a solid product with a few first-release blues. Once Novell adds user groups and a *Windows* interface, *Lite* may be the one to beat. For now, however, *LANtastic* is a better buy unless central administration is a must.

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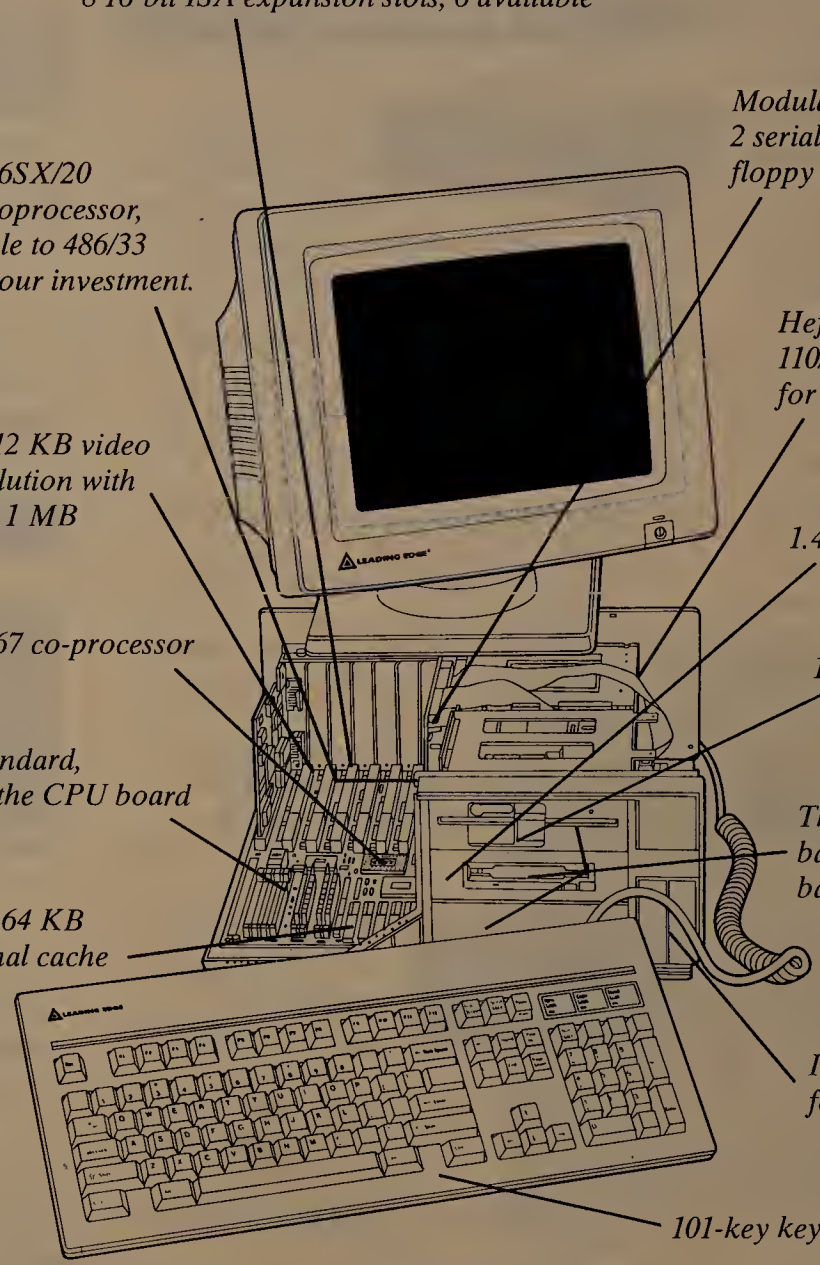
THE LEADING EDGE 486SX AS SEEN BY A PROPELLER HEAD.



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- *Modular design allows utmost flexibility allowing upgradability by utilizing off-the-shelf components*

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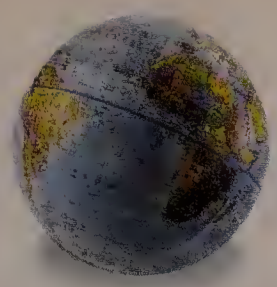

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FEATURES EVALUATION

Peer-to-Peer LANs Add Security, Windows Support

Peer-to-peer LANs have always delivered flexible resource sharing, but the latest packages, such as our Best Buy, LANtastic A/I, also give you strong Windows and multiuser security features.

● Yes ◒ Deficient
○ No

	10Net 5.0	Invisible Network for Windows AI 3.0	LANtastic A/I 4.0	NetWare Lite 1.0	PowerLan 2.11
Standard features					
List price for 5/10/20 users	$557/$799/$1590	$745/$1490/$2980	$794/$1289/$2279[1]	$495/$990/$1980	$795/$795/$795
Base RAM left free with/without high memory (K)[2]	611/445	602/476	601/502	613/486	603/495
Administration					
Menu-driven installation	●	◒[3]	●	●	●
Not copy protected[4]	●	○	●	○	●
Drivers for popular network boards included	●	◒[5]	●	●	●
Menu-driven administrative utility	●	●	◒[6]	◒[7]	●
Manage entire network from any workstation	●	●	●	●	●
User and group names shared by all stations	○	○	●	●	n/a
Install print queue, printer on separate workstations	●	○	●	○	●
Resource sharing					
Share drives and printers	●	●	●	●	●
Share modems	○	○	●[8]	○	○
Save resource connections	●	●	●	○	●
Automatic reconnect	○	●	●	●	●
Start-up synchronization	●	●	●	○	●
Browse resources	●	◒	●	●	●
RAM-resident utility	●	○[9]	●	○	◒[10]
Multiuser support					
Assign rights to users	●	●	●	●	○
Assign rights to groups	●	●	◒[11]	○	n/a
Restrict access to subdirectories of shared directory	●	○	●	○	○
<Ctrl>-<Alt>-<Delete> intercept	○	◒[12]	●	●	●
Access NetWare servers	○	○	●[8]	●	●
Messaging	●	●	●	●	●[13]
Windows support					
Work with Windows	●	●	●	●	●
Windows interface	●	●	●	○	○
Service and support					
Daily support (hours)	10	8	10	10	9
Unlimited free support	●	●	●	○[14]	●
Toll-free number	○	○	●	●	○
Weekend support	○	○	●	○	○
BBS/fax support	●/●	●/●	●/●	●/●	●/●
			BEST BUY		

[1] LANtastic A/I 4.0 prices include $299 charge per network for Windows interface.
[2] Measured on a Compaq 386/20 running DOS 5.0, with both client and server software loaded. Before loading network, free RAM was 613K/579K. The Ethernet adapter was a Standard Microsystems Elite16, except in the Invisible Network for Windows AI 3.0 test, which used a Novell NE2000.
[3] Several important steps must be done manually.
[4] Does not require separate serialized installation disk for each station.
[5] Novell NE1000, NE2000, and 100 percent compatibles only.
[6] Can't select users or groups from menu.
[7] Can't set start-up remote drives and printers with menu.
[8] Extra-cost option.
[9] Windows users only.
[10] Except print queue.
[11] Only by using wild cards.
[12] Default configuration has intercept toggled off.
[13] Broadcast to all users only; cc:Mail free to first 8 users, $595 per 25 additional users.
[14] Support available at flat rate of $20 per incident, or at $2.95 for the first minute and $1.95 for each additional minute through 900 number.

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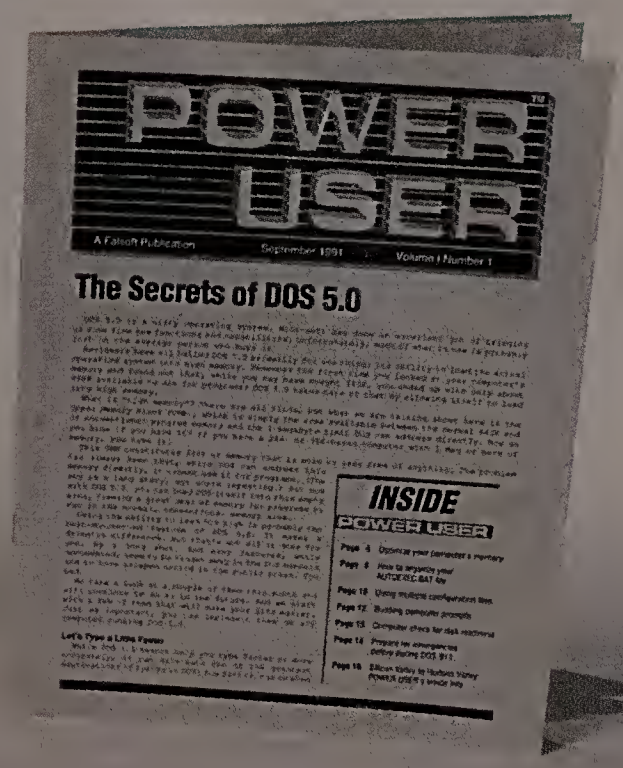
Not all data compression products are created equal!	*SuperStor New Version 2.0*	Stacker 2.0
Compresses hard drives, RAM, floppy, and other removable media by an average ratio of 2:1, doubling your disk capacity!	YES	YES
Real-time on the fly data compression doesn't slow down your PC!	YES	YES
Universal Data Exchange allows compressed floppies or removable drives to be read and saved by any PC!	YES	NO
Fully integrated menu-driven software program offers ease of installation and operation!	YES	NO
Advanced Compression Utility Tool Kit scans, checks, and repairs compressed data!	YES	NO
Advanced Disk Optimization Utility defragments or consolidates compressed data for optimal disk performance!	YES	NO
Highest compression ratio of any data compression software (up to 25% greater with version 2.0!).	YES	NO
Automatically updates CONFIG.SYS on physical partition to further enhance transparent operation!	YES	NO
Dynamically adjusts drive capacity to fit more data on compressed disks with less effort!	YES	NO
Performance enhancing Disk Cache results in faster system performance!	YES	YES
Device driver easily loads high, maximizing conventional memory for RAM-intensive applications!	YES	YES

Circle 2 on reader service card

How to? How to!



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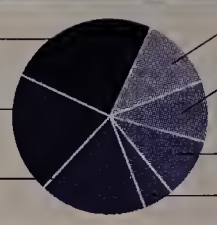
EXECUTIVE SUMMARY

LANtastic Still First Among Peer LANs

Whether you run DOS or Windows, Artisoft's LANtastic A/I is the easiest peer-to-peer LAN to install and use.

LANtastic A/I 4.0 successfully defends its Best Buy crown through no-sweat installation, easy daily use, superior resource sharing, and an unbeatable Windows interface. Sitka's **10Net** is an option if security is of prime importance. **NetWare Lite** is a good choice if central administration is a high priority—but you'll have to give up some peer-to-peer features, and Novell's pay-as-you-go tech support may cost you a bundle.

Key Buying Issues: Percentage of Importance



Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Ease of use	Administration	Resource sharing	Multiuser support	Windows support	Service and support	Price	Overall value
10Net 5.0	690	☆☆	☆☆☆½	☆☆☆	☆☆	☆☆☆☆	☆☆	☆☆☆½	★★★
Invisible Network for Windows AI 3.0	691	☆½	☆☆	☆☆½	☆☆	☆☆☆☆	☆☆☆½	☆☆½	★★½
LANtastic A/I 4.0	692	★★★½	★★★½	★★★★	★★★½	★★★★	★★½	★★★	★★★★
NetWare Lite 1.0	693	☆☆½	☆☆☆½	☆☆☆	☆☆½	☆☆½	☆½	☆☆☆½	★★★
PowerLan 2.11	694	☆½	☆☆½	☆☆☆	☆☆	☆☆½	☆☆	☆☆☆½	★★½

Overall value is produced by multiplying each category rating by its weight percentage, summing the results, and grading on a curve to the nearest half number.

To Peer or Not to Peer

There's little argument that peer LANs are relatively inexpensive and are usually easy to use, but will they do the job as well as server-based NOS's like NetWare?

There are no hard-and-fast rules in the LAN world, but it's safe to say that if your LAN is large enough to require a full-time network supervisor (say, over 25 workstations), you're probably better off with server-based NetWare. Managing a large LAN is much easier with the centralized administration tools offered by a server-based NOS. As a rule of thumb, the higher the technical level of the users, the larger the peer network can be—the administrator won't be overloaded if each user can handle basic maintenance tasks.

Taking a Risk With Peer Multiuser Applications

It *is* safe to run a multiuser data base on a peer LAN—but only so long as no more than one person is allowed to make changes at the same time. If you ignore this rule, and the workstation that holds the data base crashes, data files will probably be corrupted. Then you'd better hope that you have a recent backup.

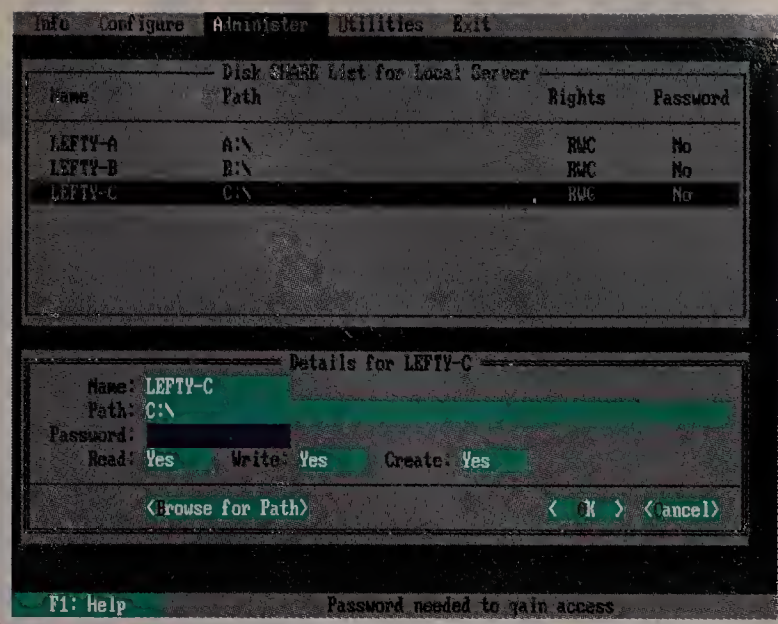
Your data will be somewhat safer if you dedicate a PC on your peer NOS to running the data base and avoid using it as a workstation. But if you're going to all that trouble and expense, NetWare is a better choice. Since NetWare servers perform only a few specialized tasks, they seldom crash, and when one does, its transaction-tracking system keeps data base files from being corrupted. In addition, assuming the server is not overloaded, NetWare's operating system will run the data base faster than a peer NOS, and peer multiuser applications will slow down considerably if the local user is straining the system in the foreground.

PowerLan 2.11

★★½ **PROS:** cc:Mail included, inexpensive for larger nets **CONS:** Primitive security, requires log-in server, no Windows interface

PowerLan's $795 flat-rate pricing makes it a bargain for all but the smallest LANs, and it gives you a full set of flexible resource options and free *cc:Mail* for the first eight users. It's the only peer LAN reviewed that also gives you the option of installing it with a dedicated file server, but this option costs $995 extra for 10 users and another $995 for 20. And if you're serious about a server-centric network, you should go with a real server-based NOS that's optimized for multiuser access. Fortunately, *PowerLAN* coexists with NetWare quite nicely.

But *PowerLan* is disappointing in some important ways: There's no *Windows* interface, security is primitive, and the DOS user interface is unnecessarily confusing. Installation is almost fully automatic, but some administration tasks (and most daily uses) are complicated: *PowerLan* forces you to choose between two toilsome utilities. The first is cursed with a Byzantine menu structure and nerd selections such as 'Max NetBIOS Sessions'. The second presents the network as a hierarchical tree, which makes it easier to find resources, but connecting to them is another story. For instance, reaching the LPT list takes three commands and two dialog boxes—and since the bare-bones manual was no help, we had to call tech support to find our way.



With PowerLan, installation is almost totally automatic. Unfortunately, connecting to remote drives and printers is a lot more complicated.

PowerLan's awkward security system is limited to password protection of drives and printers. Some additional security is provided by designating one nondedicated workstation as a log-in security server, which prevents unauthorized persons from getting onto the network in the first place. But if it goes down, no one can log on, and if you choose not to use this option, you won't be able to use the menu-driven utilities or any security feature.

PowerLan covers the peer-to-peer basics, and flat-fee pricing makes it a fairly good deal for larger LANs. But if you expect your LAN to make resource connections easy or provide flexible security, look elsewhere.

An emerging trend offers LAN users the best of both worlds: *NetWare Lite, PowerLan,* and a special version of *LANtastic* all run quite happily on top of NetWare. You simply load both network shells—after which you can access a multiuser data base on the server as easily as you can data and printers at a remote workstation. The peer NOS's and NetWare employ different menus and commands, of course, but drives and printers can be used just the same, whether they're on the NetWare server or a peer workstation.

Since printer sharing and E-mail are the first group applications a work group craves, peer-to-peer LANs are a good first step into networking. As your LAN gets bigger and begins to demand more attention, switching to NetWare will probably become more efficient—especially if you need safe, shared access to multiuser applications.

WHERE TO BUY

10Net 5.0
Sitka Corp.
950 Marina Village Pkwy.
Alameda, CA 94501
800/445-8677, 510/769-9669
LIST PRICE: $129 per user, $299 per 3 users, $799 per 10 users
Reader service no. 690

Invisible Network for Windows AI 3.0
Invisible Software, Inc.
1142 Chess Dr.
Foster City, CA 94404
415/570-5967, 415/345-5509 (BBS)
LIST PRICE: $149 per user
Reader service no. 691

LANtastic A/I 4.0, LANtastic for Windows 1.0
Artisoft, Inc.
Artisoft Plaza
691 E. River Rd.
Tucson, AZ 85704
800/846-9726, 602/293-6363
LIST PRICE: $99 per user, $2499 unlimited; Windows interface $299 per network; LANtastic for NetWare $499 per network; modem sharing $399 per network, conversion for current NetWare users $499; voice board $99
Reader service no. 692

NetWare Lite 1.0
Novell, Inc.
122 E. 1700 South
Provo, UT 84606
800/638-9273, 801/429-5533
LIST PRICE: $99 per user
Reader service no. 693

PowerLan 2.11
Performance Technology, Inc.
800 Lincoln Center
7800 IH West
San Antonio, TX 78230
800/327-8526, 512/349-2000
LIST PRICE: $795 per network; E-mail free for first 8 users, $795 to $995 per 25 additional users; central tape backup utility $1495
Reader service no. 694

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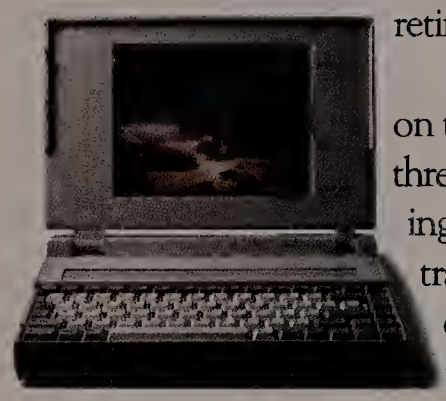

Not to mention that each pixel on the screen is controlled by three individual transistors, ensuring perfect focus and color registration. The result is amazing clarity far superior to desktop monitors and a brighter, faster screen that far exceeds passive matrix LCD color screens.

Combined with a blazing 25MHz, 486SX microprocessor and 8K internal cache, it's powerful enough to handle your wildest visions.

Of course, you shouldn't be limited by the number of ideas you have either. Which is why the T4400SXC is equipped with a 120MB hard drive for plenty of storage. And 4MB of RAM expandable to 20MB.

And since ideas happen anywhere, any time, we've designed it to fit in half of a briefcase and given it a Nickel Cadmium battery that lasts 3 hours per charge.

Of course, there are times like payday when it is necessary for you to be in the office. Which is why we made our new notebook to be expandable with our Deskstation IV, giving you two expansion slots, and ports for external monitor and external keyboard.

intel inside

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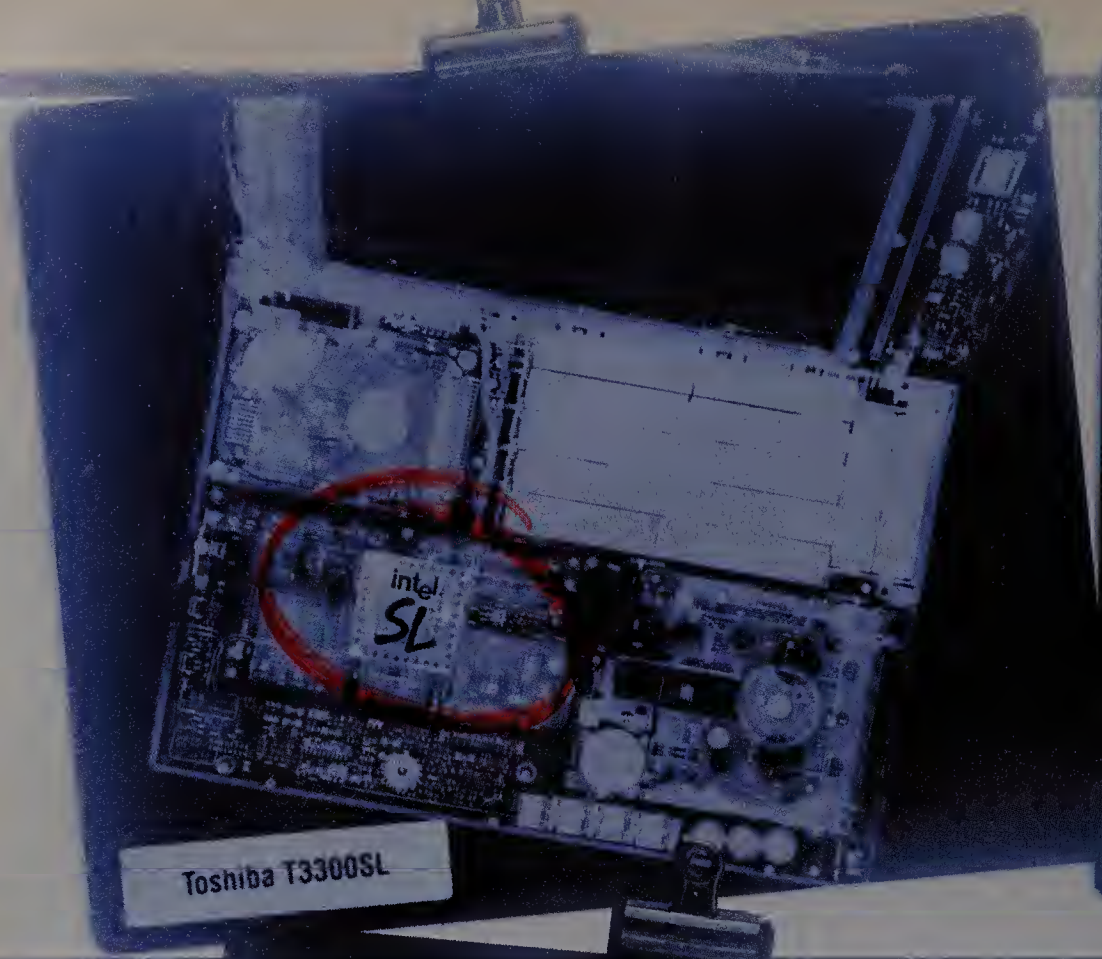
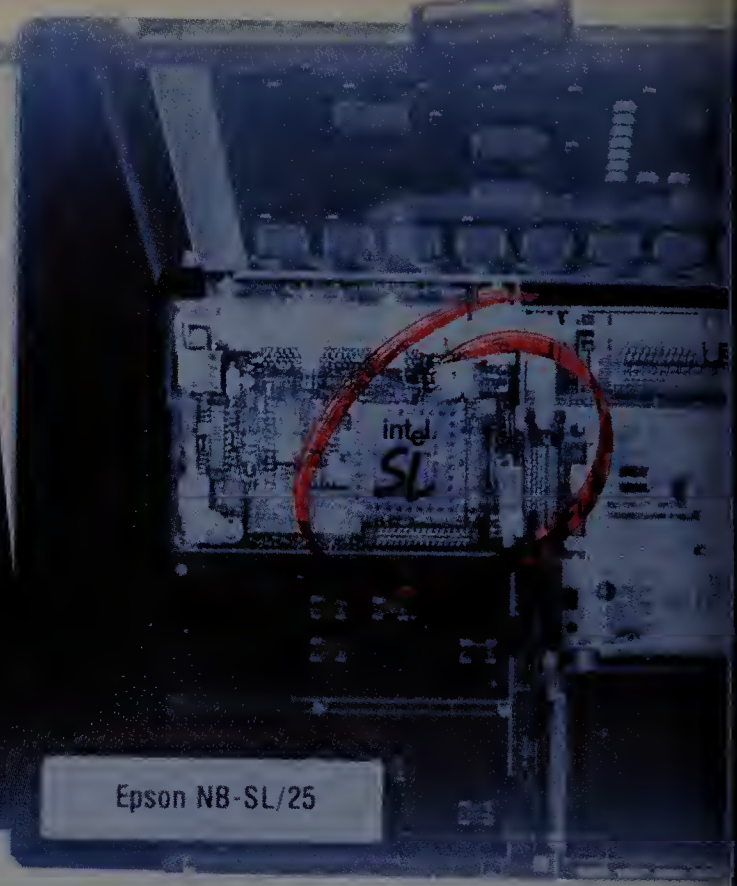


Toshiba T3300SL



Epson NB-SL/25

Dell 325NC

Look what's at the hear

Take a closer look at some of the best notebook computers and it's easy to see why the prognosis is so good—they each have an Intel SL microprocessor. The Intel SL gives each of these unique notebooks a leg up, because it was designed specifically for the stop-and-go world of mobile computing.

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Average 386 SX
4.8 hours

Intel386™ SL
8.2 hours

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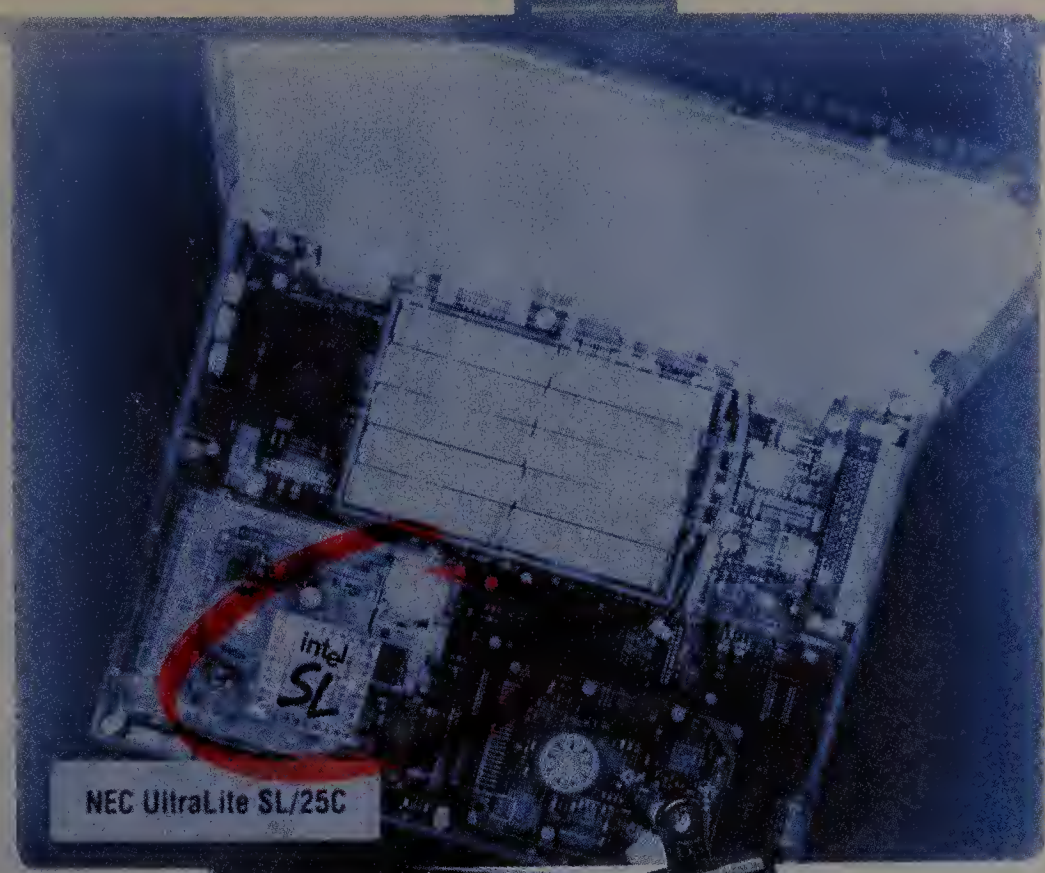
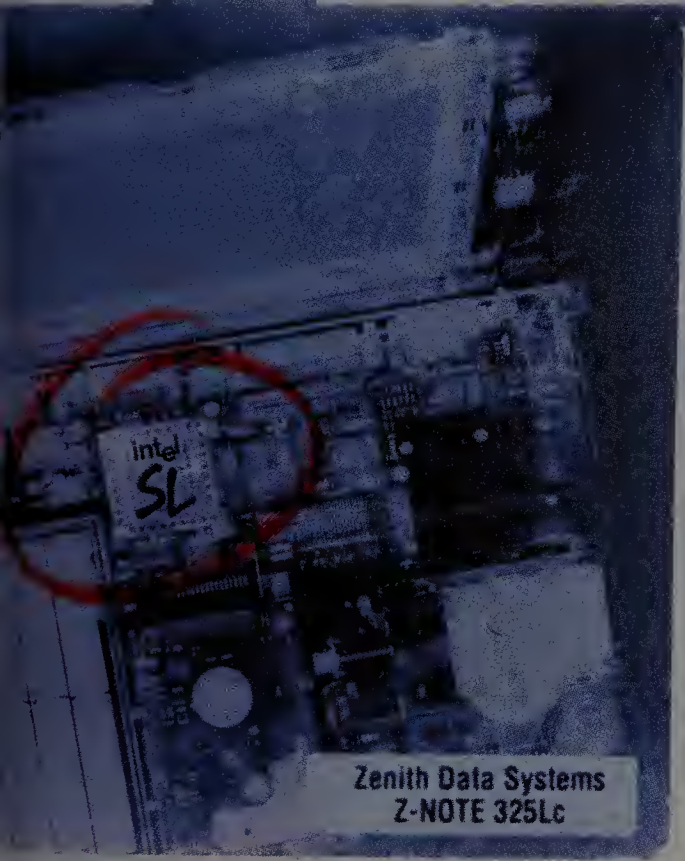


NEC UltraLite SL/25C



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Z-NOTE 325Lc

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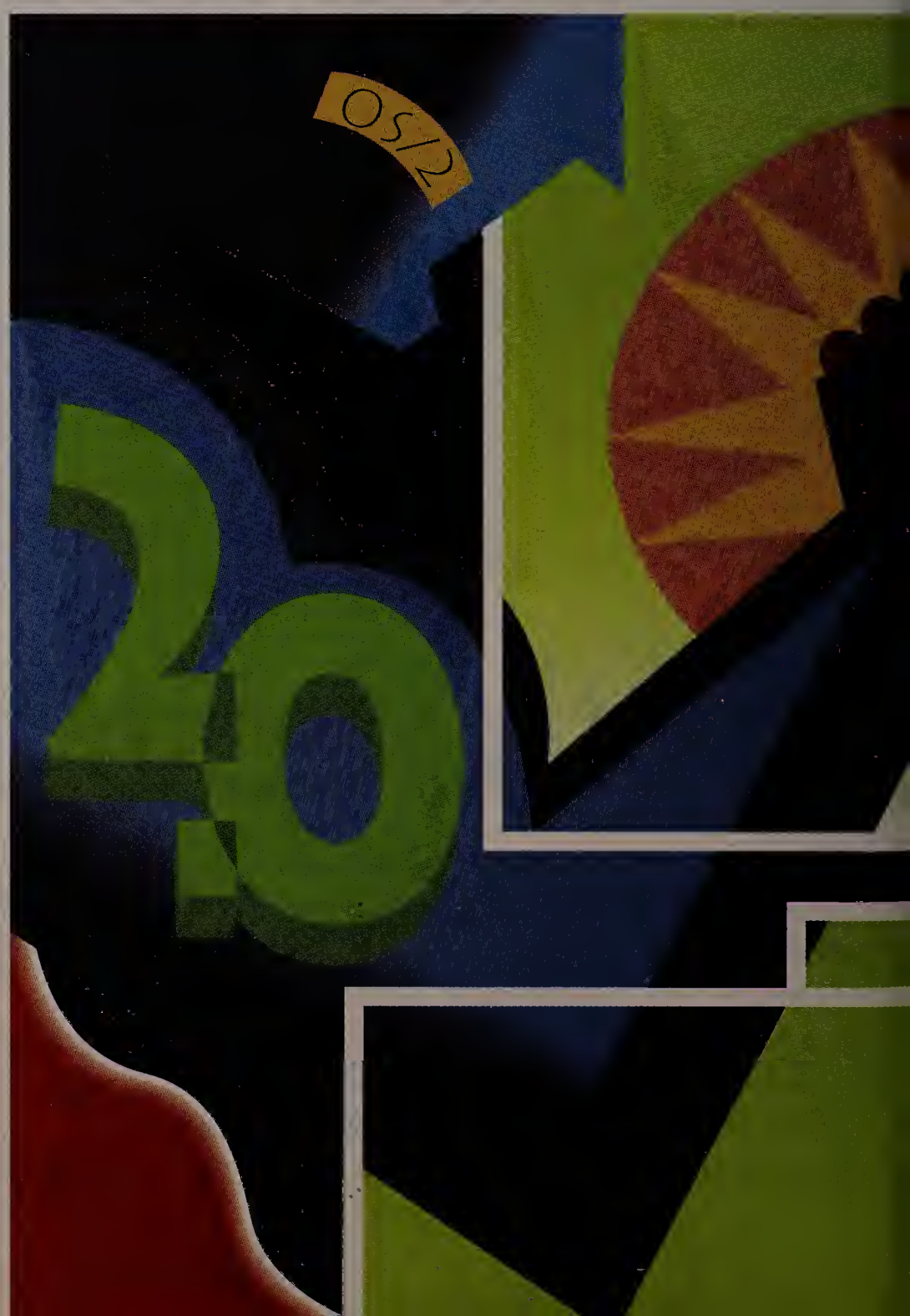
Circle 107 on reader service card

OS/2 2.0 CHALLENGES WINDO

BY PETER D. VARHOL

The release of IBM's OS/2 2.0 and Microsoft's *Windows 3.1* gives you a real choice in PC operating environments. Conventional wisdom says to follow the applications, and *Windows* clearly has more. But conventional wisdom proves simplistic in this case. While OS/2 has fewer applications, it promises higher performance because version 2.0, unlike *Windows,* supports 32 bits as well as 16 bits. Besides, OS/2 is designed to run *Windows* applications seamlessly as though they were written for OS/2—and both environments run DOS applications, although each in its own way.

This article is the first in a series to help you sort all this out. In future installments we'll give OS/2 further scrutiny as a platform for DOS and *Windows* applications, and we'll compare the performance and reliability of the shipping versions of *Windows 3.1* and OS/2 2.0.



Space-Age Technology

OS/2 is a space shuttle of technology compared to *Windows'* refurbished Chevy. With seamless access to all system memory, preemptive multitasking, and 32-bit code, OS/2 2.0 is far more elegant, despite its size, than the awkward *Windows*-DOS combination. But it takes a lot of hardware to get OS/2 2.0 off the ground—at least 4MB of RAM, a minimum of 15MB of disk space, and 386 or greater processing power.

I put OS/2 through its paces using three different hardware configurations: a 386/33 with 4MB of memory, the same 386/33 with 8MB of memory, and a 486/33 with 8MB of memory. Both systems are clones—the 386 is a Blue Star and the 486 is an Apex—equipped with 120MB IDE hard disks and the 16-bit AT disk interface. As an experiment, I also ran OS/2 on a Wyse Decision 386/40, which is built on an AMD chip, and was generally satisfied with its performance. (To find out if your system is equipped for OS/2, contact the IBM National Support Center bulletin board.)

OS/2 2.0 ships on 21 high-density 3½-inch disks—1 install, 14 system, and 6 printer driver disks. Installation was relatively straightforward, though there are enough pitfalls that I recommend reading the installation guide first. I had the option of installing the entire operating sys-

OS/2 better than Windows? Would you rather ave a 2000-ton space shuttle or a used Chevy ith a fresh coat of paint and bald tires?

WS 3.1

ILLUSTRATION BY DAVID FLAHERTY

tem, which takes about 30MB of disk space; predefined options, about 18MB; or selected options, as little as 15MB for a bare-bones system. Installing the whole thing can take almost an hour.

Choices include installing OS/2 2.0 as a dual boot (OS/2 and DOS) or multiple boot system. The multiple boot lets you choose among OS/2 (both current and earlier versions, if needed), DOS, and UNIX (all on separate disk partitions) at boot time. Using dual boot, you must start one operating system and reboot to the other. The dual boot option requires changes to the DOS CONFIG.SYS and AUTOEXEC.BAT files that are best made before installation begins—another good reason to read the installation manual first.

You can also choose your file system at installation. You can use the DOS FAT (the File Allocation Table, which accesses files by searching a table), OS/2's High Performance File System (HPFS), or third-party file systems. However, to run the dual boot, with OS/2 and DOS residing on the same partition, you must install DOS and its FAT file system first, and then install OS/2 without reformatting the hard disk. With the multiple boot option, you can format the OS/2 partition as HPFS while maintaining DOS in a FAT partition.

I installed the full operating system with the dual boot option—my old DOS and *Windows* only a <Ctrl>-<Alt>-<Delete> away. This meant that I retained the FAT and the inability to use long file names. I suspect this is the way most people will initially install OS/2 2.0.

We Have Lift-Off

On my 4MB 386/33, OS/2 was slow almost to the point of being unusable. Though I wasn't running the shipping product (the code will likely be tightened up somewhat for actual release), a 4MB 386/33 should be considered the minimum hardware configuration for the product. Much of the sluggish performance seemed to be due to disk swapping, especially when I tried opening multiple windows and folders or when one or more applications were minimized. Windows painted themselves in slow motion, and applications took forever to open. The hard disk churned almost constantly.

These problems come as no surprise. In addition to the memory requirements of OS/2 itself, an active

DOS window takes more than 640K, and a *Windows* session can make use of much more. Maxing out 4MB of memory won't be difficult, even when doing ordinary work.

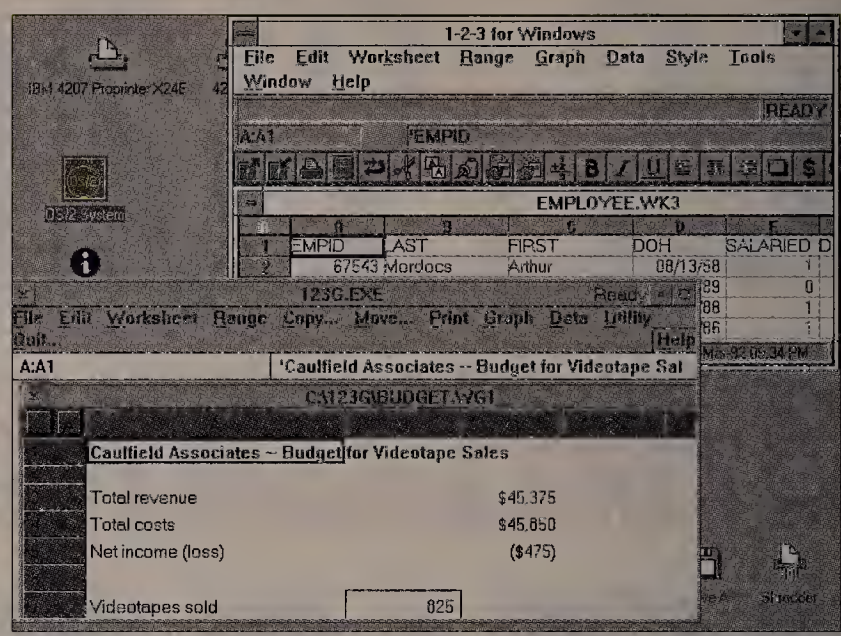
An additional 4MB of memory in this 386/33 system helped a lot. Disk swapping was not as evident, though performance still lagged a bit in running some disk-intensive applications. Not surprisingly, OS/2 worked best with the 486/33 with 8MB. Granted, beta copies tend to run large and slow, but given OS/2 2.0's capabilities, 8MB of memory is probably the most realistic recommendation. For someone running multiple applications or DOS and *Windows* sessions, a fast disk would also help.

Unraveling the Control Panel

The graphical interface, called the OS/2 Workplace Shell, is a single, scrollable desktop with a collection of windows and icons. The primary window is the OS/2 System, which contains folders for command prompts, productivity applications, system setup utilities, and, of course, games. Minimized applications are placed in their own folder, and a separate printer object appears in one corner of the screen. When many icons and folders are on the screen, the entire desktop scrolls so all objects are readily accessible. Where the Macintosh has the well-known trash can and the NeXT machine the recycling bin, OS/2 destroys things the corporate way—with a shredder.

The Workplace Shell takes a new approach to file management: It dissociates the location of screen folders from the actual location of their contents in the file system. All screen folders "reside" in a Desktop directory, even if the physical files are elsewhere. For example, when I loaded and "migrated" Lotus's *1-2-3G* to run under OS/2, I ended up with an empty *1-2-3G* folder in the disk's Desktop directory. The *1-2-3G* application files resided in a directory outside the Desktop directory. This means deleting a screen object representing an application won't delete that application from the hard disk. You must go into a separate file manager or delete the corresponding file from a command line.

Opening a drive object reveals a diagram of the directory structure for that drive, which serves as the file manager. Opening an individual directory displays all files in that directory. From this window, files can be copied and moved between directories, opened, or dragged to the Shredder. OS/2 creates drive objects for all drives on the system: in my case, A:, B:, and C:.



OS/2 can mix and match applications with ease; here it's running Lotus's 1-2-3 for Windows and 1-2-3G simultaneously.

OS/2's use of the right mouse button is a minor annoyance. While *Windows* lets you select a screen object and drag it by holding down the left mouse button, OS/2 has you select the object with the left button but hold down the right button while you drag the object. Perhaps this signifies the schism between Bellevue and Boca, just as making the sign of the cross right to left or left to right distinguishes the Eastern Orthodox and Roman Catholic churches. Certainly you have to think about where you are before you move, especially if you shift between OS/2 and *Windows*. Fortunately, the mouse utility in the System Setup folder lets you reconfigure the mouse button settings. If you do so, however, you won't be able to select and move entire groups of objects.

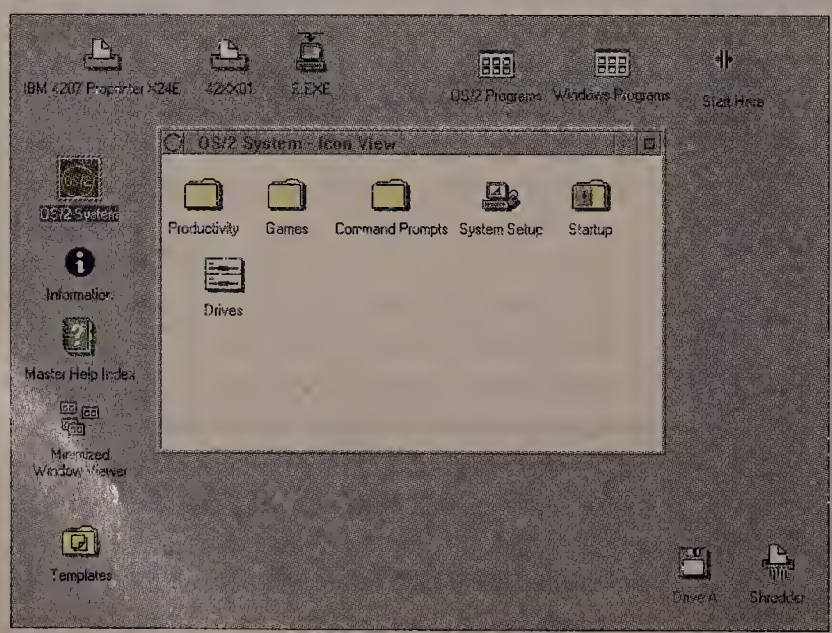
IBM bundles many applications with OS/2, including Notepad, Database Manager, Spreadsheet, Time Planner, Calendar, and, yes, Tune Editor. While none of these is a full-featured product, they help customize the Workspace and organize work flow.

System Help is extensive and clear. It uses hypertext to help the user navigate among similar topics and is carefully cross-referenced. But it's no substitute for reading the documentation.

Trying Windows Applications

The big question, of course: How well does OS/2 deal with DOS and especially *Windows* applications? Based on my experimentation with the beta software, I'd say, pretty well. IBM provides a list of conditions under which OS/2 cannot run DOS or *Windows* programs. The list seems long but includes only a few important applications. For example, OS/2 does not work with DOS programs that use the older Virtual Control Program Interface (VCPI) for extended memory access. Instead, it supports the new DOS Protected Mode Interface (DPMI) proposed by Microsoft and supported by most of the DOS extender vendors.

The Command Prompts folder gives you access to several command-line prompts, including a full-screen and windowed OS/2 command line, a full-screen and windowed DOS command line, and a full-screen *Windows* session. The Dual Boot icon lets you reboot to DOS. You can run multiple copies of



OS/2 2.0's graphical Workplace Shell—with its multiple windows, folders, and icons—is highly customizable.

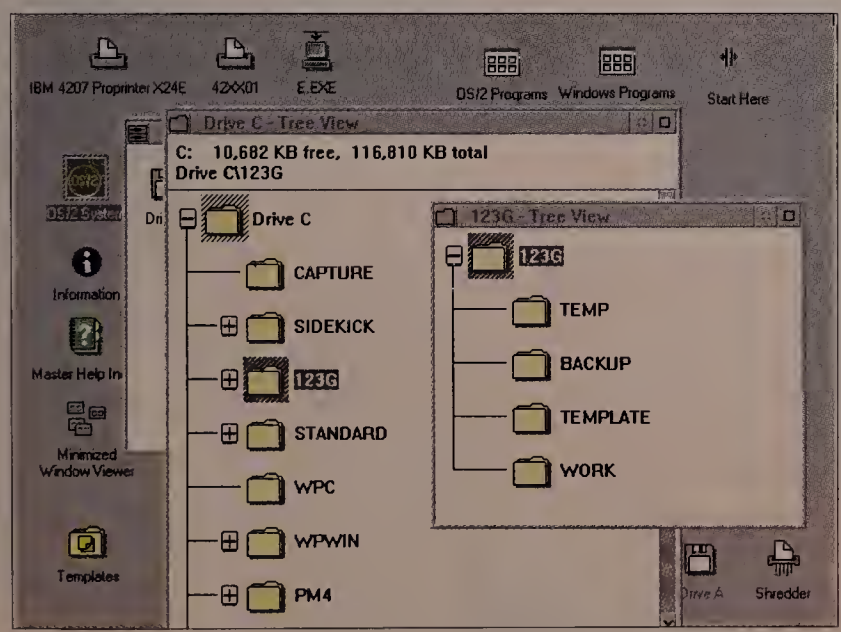
windowed DOS and OS/2 sessions by copying the screen objects and opening the new copies individually. You can run 32 DOS sessions at once, but prudence and memory requirements should generally keep this number much lower.

You can run multiple *Windows* applications under OS/2, but it's not an intuitive process. Realizing you are not actually running multiple sessions of *Windows* itself—just the *Windows* applications—is key. During installation, OS/2 asks if you want to migrate your DOS, *Windows,* and older OS/2 applications to OS/2 2.0. If you say yes, it mounts the selected applications in the appropriate folder on the Workplace Shell (you can also migrate applications after installation with a tool in the System Setup folder). You then open these applications by double-clicking on their objects, and *Windows* applications appear without actually opening *Windows* first.

I ran at least two dozen DOS and *Windows* applications under OS/2 2.0 and can report problems with only certain DOS extended-memory applications and one *Windows* application—*WordPerfect for Windows,* which crashed repeatedly and wouldn't even work in the full-screen *Windows* session. Since *WordPerfect for Windows* also has problems running under *Windows 3.1,* this hardly condemns OS/2. *Word for Windows, 1-2-3 for Windows,* and *PageMaker* ran under OS/2 2.0 without a hitch. Most device drivers will also work in a DOS session, making it possible to run off a network.

I also tested several older OS/2 applications, including *1-2-3G, SPSS, SideKick,* and the *DeScribe* word processor, with varying results. *1-2-3G* ran, but I couldn't launch it from its icon; I had to start it from an OS/2 command line or from the file manager. Two of the *SideKick* utilities would not work under any circumstances, but the utilities bundled with OS/2 make *SideKick* superfluous anyway.

Since no 32-bit applications were available at press time for testing, I couldn't examine OS/2's 32-bit capabilities. Many vendors say they will introduce 32-bit products, although as of press time, Lotus was the only vendor that had pledged to release OS/2 2.0 versions of its whole line. Traditional software development tools will be available from IBM and Borland, and several graphical application builders can be obtained from third-party developers.



Within OS/2's file manager, every drive is represented by an icon. Launching the icon reveals the contents of the drive.

If you prefer, OS/2 2.0 will give you the look and feel of OS/2 1.3 or *Windows 3.0*—you simply run a batch file from an OS/2 command line. If you choose the *Windows 3.0* look and feel, the mouse buttons behave in the familiar *Windows* way. Of course, you have to kiss the Shredder good-bye. But don't be misled by appearances; the operating system beneath is still OS/2 2.0 rather than *Windows 3.0.*

Whichever look you choose, OS/2 supports Dynamic Data Exchange, which lets applications exchange information with one another. DDE works between *Windows* applications, between OS/2 applications, and with exchanges between the two environments.

Astonishingly, at release, OS/2 2.0 didn't support super VGA, so everything including *Windows* ran in straight VGA mode when I tried the product. The *Windows* session's video is controlled by OS/2, so when the appropriate drivers are available for OS/2, they will also support a *Windows*-OS/2 session. According to IBM, drivers for super VGA will soon be available for OS/2 2.0 from the IBM National Support Center electronic bulletin board (404/835-6600).

My 120MB disk proved barely adequate for this evaluation and would not be nearly enough for day-to-day work. Even with enough hardware capability, however, taking full advantage of the operating system right away is impossible. Though graphical, the user interface requires careful study and practice for productive use.

Yet with experience using OS/2 2.0, I felt in control of all my system's power. I had the control and power of UNIX without arcane syntax. Soon I was multitasking DOS applications while I wrote this article in *Word for Windows,* all from the OS/2 desktop.

A Great Deal If You Can Park It

Is OS/2 better than *Windows?* Would you rather have a 2000-ton space shuttle or a used Chevy with a fresh coat of paint and bald tires? It depends on whether you need to orbit the earth or commute to the office. Certainly, OS/2 2.0 is more capable than *Windows 3.1.* OS/2's impressive functionality demands high-end hardware—no one would want to cripple this operating system by running it on a lower-end *Windows* platform.

Anyway, you may have to base your decision on the parking space available. Then again, you may not be able to pass up the space shuttle since it's priced about the same as the Chevy—$139 for first-time buyers, $99 for DOS users, and $49 for *Windows* upgraders.

Although OS/2 2.0 is priced as a competitor of *Windows 3.1,* its capabilities are comparable to those of UNIX/Open Desktop and the upcoming 32-bit *Windows NT. Windows* and OS/2 2.0 will likely coexist in many organizations, with OS/2 often acting as a workgroup file server. *Windows* may continue to attract most users, while the greater flexibility and control of OS/2 lure power users.

Peter D. Varhol is a freelance writer and an assistant professor of computer science and mathematics at Rivier College in New Hampshire.

WHERE TO BUY

OS/2 2.0
IBM
800/342-6672
Reader service no. 834

Windows 3.1
Microsoft Corp.
800/642-7676
Reader service no. 835

50 SPREADSHEET TIPS

You do the same spreadsheet tasks day after day. You know there are shortcuts, but who has the time to pore over a ponderous manual looking for them? Yet you love the thrill of discovering some nifty way to save keystrokes or do something you had no idea you could do with your spreadsheet. That's why we consulted software developers, hotshot spreadsheet jockeys, our editors, and scores of books to bring you this collection of tips. These pages are brimming with tricks and techniques that will enhance your relationship with your spreadsheet, whether you use *1-2-3 2.3, 3.1+, 1-2-3 for Windows, Excel 3.0,* or *Quattro Pro 3.0,* and whether you're a power user or a neophyte. And there's a bonus: tips for the just-released *1-2-3 2.4, 1-2-3 3.4, Quattro Pro 4.0, Quattro Pro for Windows,* and *Excel 4.0.*

PSST!

Over here. Try these tips—the best of hundreds culled from scores of experts—and stop doing things the hard way, whether you use Excel, Quattro Pro, or any flavor of 1-2-3

•

EDITED BY CHRISTINA WOOD

MICK WIGGINS

1-2-3 2.3 AND 3.1+

1 PREVENT ROW OR COLUMN INSERTS

If you want to prevent users of your spreadsheet from inserting rows or columns and messing up the whole worksheet, just enter any sort of data (even a blank space) into row 8192, column IV. Having data in that cell prevents any new rows or columns from being inserted. Anyone who tries to add a row or column will get a File Full error. This tip works in *1-2-3 for Windows* and *Quattro Pro* as well.

2 SPEED UP HEADS-DOWN DATA ENTRY

It can be a real annoyance to use the cursor keys to move the cell pointer down when entering long columns of tabular data. **LISTING 1** contains a macro that automatically moves the pointer for you. Type **'\A** to enter its name in column A. Starting with the adjacent cell, begin entering the macro commands in column B. With the cell pointer on the macro name, select */Range•Name•Labels•Right* to assign the name to the macro.

Move the cell pointer to the first cell in the table's first column. Press **<Alt>-A** to start the macro, then type a number and press **<Enter>** (note: This macro works only for numbers). The pointer moves down the column automatically. When there are no more numbers to enter in a column, enter **N**. This moves the pointer to the top of the next column. Enter any letter other than *N* to quit data entry.

3 A YEAR OF SUNDAYS

Hate thumbing through your Day-Timer to check on future appointments? If you have a meeting or event that always takes place on the same day of the week, *1-2-3* can tell you which dates they fall on for the whole year, which will help you avoid messy scheduling snafus. If you'd like to figure out a set of dates for a whole year, for instance, choose */Data•Fill,* highlight the range of cells where you want the dates to appear, and press **<Enter>**. For a list that begins with June 1, 1992, type **@DATEVALUE("6/1/92")** at the Start prompt. At the Step prompt, enter **7** if the event happens every week, **14** if it occurs every two weeks, and so on. At the Stop prompt, enter **99999**. Use */Range•Format•Date* to select the date format. Your sequential list of dates will now appear. If the cells appear full of asterisks, it means the column is too narrow and you will need to use */Worksheet•Column•Set Width* to adjust the column width.

4 A 1-2-3 ROAD SIGN IN DOS

If you find yourself loading multiple copies of *1-2-3* because you forgot that you used the /System command to shell out to DOS, try this simple batch file—you'll never get confused again.

In any text editor, enter the following file, replacing *1-2-3 directory name* with the name of your *1-2-3* directory, and name the file **123.BAT**:

```
ECHO OFF
PROMPT Type EXIT to return to
  1-2-3$_$P$G
CD1-2-3 directory name
123
CD\
PROMPT $P$G
```

Put it in your batch file directory (or anywhere except the *1-2-3* directory), and be sure your AUTOEXEC.BAT file's PATH command lists that directory. Now when you use */System* to exit to DOS, 'Type EXIT to return to 1-2-3' will appear on a line above the DOS directory prompt the entire time. When you exit from *1-2-3,* the batch file resets the DOS prompt to its usual appearance.

5 PERSONALIZED SHEETS

Every time you launch *1-2-3,* it loads a blank worksheet. You can customize this worksheet with your own formatting, formulas, macros, auto-execute macros, or custom menus. This is great if you always work in the same format or if you're setting up a system for someone to do specific tasks. All you have to do is format a worksheet the way you want it, and store it in your *1-2-3* directory with the file name **AUTO123.WK1**. From now on, *1-2-3* will automatically load this file every time you launch the program.

6 INSTANT LISTS

Everyone knows you can use */Data•Fill* to create a column of numbers for an itemized list. If you prefer a column of letters, enter the formula **@CHAR(64+@CELL("ROW",A1))** in cell A1. Then copy this formula into cells A2 through A26. *1-2-3* will produce an alphabetic column of capital letters. To get lowercase letters, replace '64' in the formula with **96** (64 is the ASCII code for *A;* 96 is the ASCII code for *a*). If you want to move the list elsewhere in the spreadsheet, first use */Range•Value* to convert the formulas to labels.

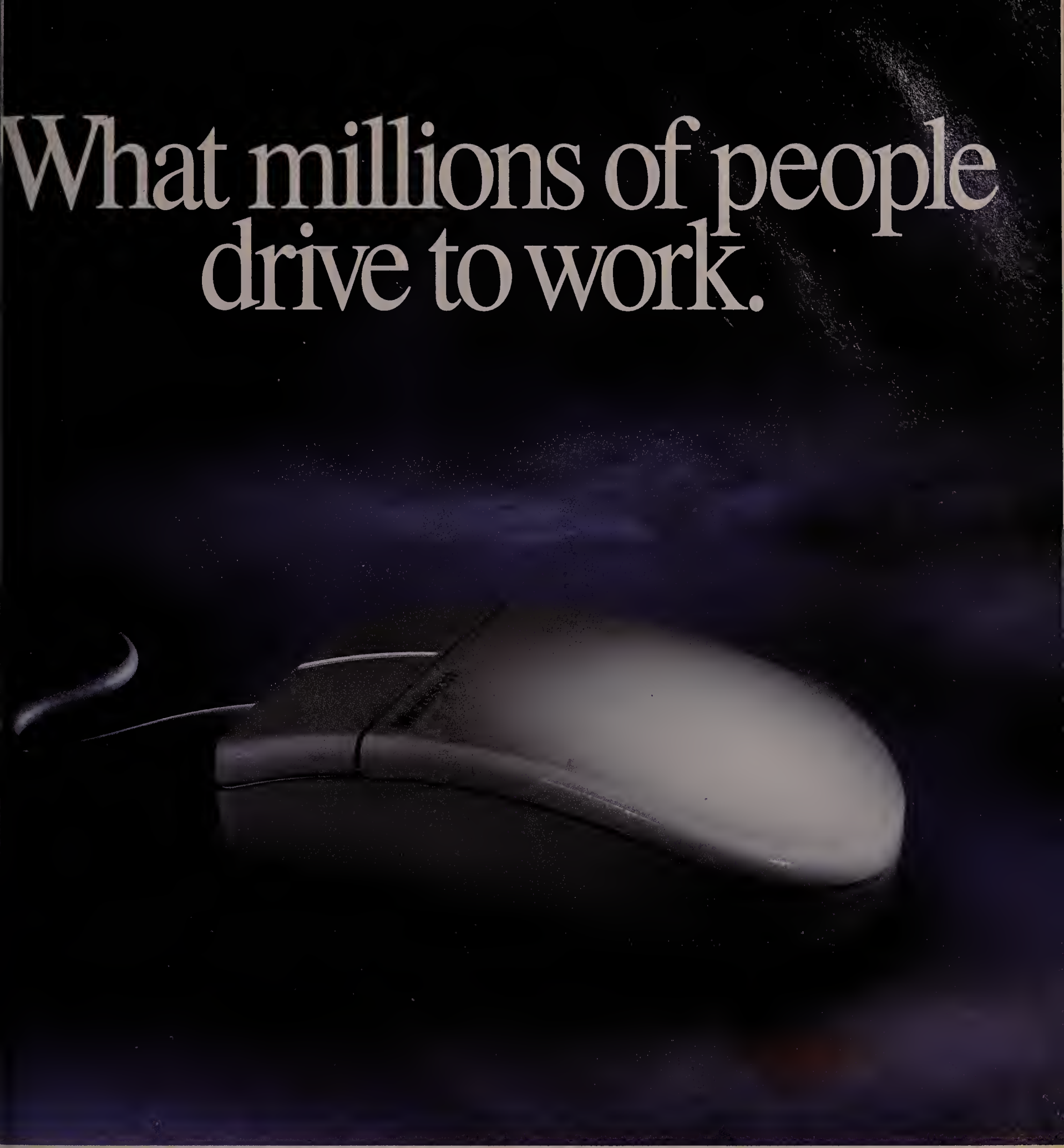
7 MORE MEMORY

Do you get an irritating 'Out of Memory' message when working with large spreadsheets? For the fearless there's a simple way around the problem.

```
{?}~
{IF @UPPER(@CELLPOINTER("CONTENTS"))="N"}/RE~{UP}{END}{UP}{RIGHT}{BRANCH \A}
{IF @ISNUMBER(@CELLPOINTER("CONTENTS"))<>1}/RE~{QUIT}
{DOWN}{BRANCH \A}
```

LISTING 1: Use this macro to save keystrokes when typing columns of numbers.

What millions of people drive to work.



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hand. Comfortable and responsive, provid-
ing them with total control of the Windows™
graphical environment.

For others it's speed. They relish the
thought of racing through their spread-
sheets, word processors and other mouse-
driven applications, in record-breaking time.

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1-2-3 reserves approximately half of your computer's available memory for Undo, a function that you can disable. Use */Worksheet • Global • Default • Other • Undo • Disable,* and you'll instantly have more memory available. But be careful after you make the change, because you can no longer undo! To enable the Undo function, select */Worksheet • Global • Default • Other • Undo • Enable.*

8 GRAPHS THAT DON'T BUG YOUR EYES

When *1-2-3* creates a black-and-white graph, it uses cross-hatching to differentiate bars. This can sometimes create an optical illusion known as a *moiré,* in which the graph seems to waver on the screen or page. Select */Graph • Options • Color* to change the default mode of the display to color. *1-2-3* will replace the mixture of patterns with gray tones, eliminating the moiré effect. This will improve the look of your graphs even if your monitor and printer are black and white.

1-2-3 PROGRAMMING TIPS

9 STOP THAT MACRO

An auto-execute macro (\0) is designed to run as soon as its file is retrieved. But if you're debugging, you may want to load the file without running the auto-execute macro.

To do this manually, press <Ctrl>-<Break> while *1-2-3* retrieves the file containing the macro. Doing so infrequently is fine. But if you're debugging or editing a complex auto-execute macro that requires many rounds of revisions, this can be tedious. To turn off the auto-execute function, select */Worksheet • Global • Default • Autoexec • No • Quit.* Perform as many revisions to the macro as you like, and start the macro manually with the Run key (**<Alt>-<F3>**). When you're ready to test the macro in auto-execute mode, turn the auto-execute macro default back on with */Worksheet • Global • Default • Autoexec • Yes • Quit.*

10 PREVENT ACCIDENTAL MENU SELECTIONS

Keyboards have a type-ahead buffer that stores keystrokes until the processor is ready to handle them. So if your users press the <Enter> key one (or more) times too many, they can accidentally ask your macro-driven worksheet to execute commands from the menu. That's why it's a good idea when creating custom menus to set up a safety net—make the menu's default choice do nothing.

To do so, make the leftmost menu choice on a custom menu blank. For its description, use 'Safety...returns to this menu'. If that menu choice is selected, nothing happens. You have to use the cursor keys to select another menu option.

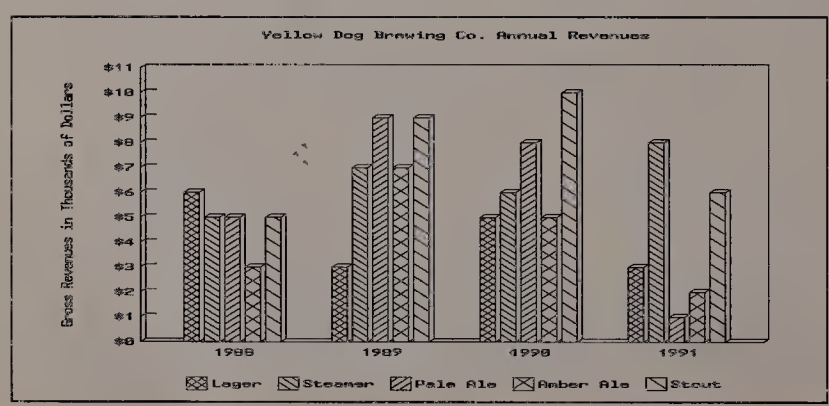
11 GIVE PAUSE TO YOUR MACRO

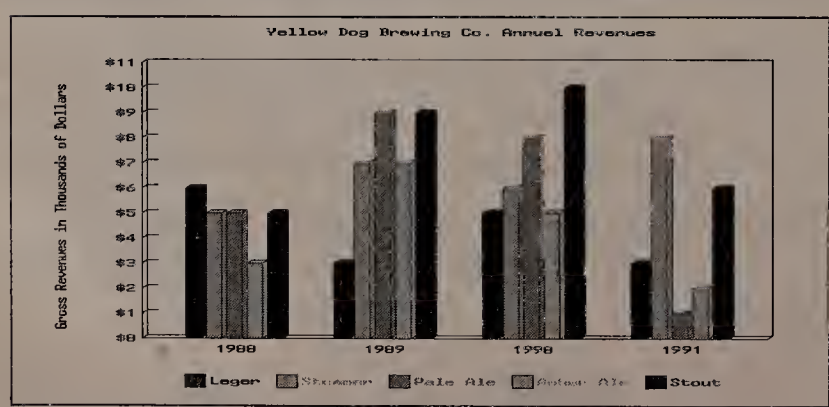
When you test macros, you probably insert pauses ({?}) to let you adjust a running macro. The macro waits for you to press <Enter> before proceeding. These pauses can be annoying. It's a chore to remove them, but you can turn them on and off by using the {IF} macro command. First, name a cell **TESTMODE**. Instead of using just {?} to install pauses, use **{IF @UPPER(TESTMODE)="ON"}~{beep 3}{?}~**. Now you can turn the pauses on or off by typing either **ON** or **OFF** (or anything that's not 'ON') into the cell named TESTMODE. If TESTMODE equals 'ON', the macro beeps and pauses. If it doesn't, the macro doesn't beep or pause.

12 LOST ON THE RANGE

A large, named range of cells can be damaged by certain commands such as /Move, /Worksheet Delete, and so on. When the name of the range is lost, it's impossible to use the Goto key (<F5>) to find the range unless you know the cell address. As a result, macros that depend on the range name will no longer work.

You can save yourself the trouble of having to hunt around for your range by giving the upper left-hand corner cell of the range a name of its own. You could use a simple naming convention—such as a *ULC* suffix to mean "upper left-hand corner"—for easy identification of the range. If your range were named INPUT, for example, you could name the upper left-hand corner cell INPUTULC. Then if INPUT were accidentally damaged, you could quickly go to INPUTULC and re-create the lost or damaged range.





SCREENS 1 & 2: Make black-and-white graphs easier on the eyes: Display or print them in color mode to get gray shades.

BONUS TIP

1-2-3 2.4 AND 3.4

SMARTICONS FROM THE KEYBOARD

1-2-3 releases 2.4 and 3.4, though DOS-based, have borrowed SmartIcons from their *Windows* relatives. You can create icons to get instant access to your macros (use /Add Icon). Many die-hard DOS users will want to use SmartIcons, but they cringe at the idea of touching the mouse. Fortunately, you can access SmartIcons with the keyboard. Press <Alt>-<F7>, and use the cursor keys to move to the SmartIcon you want to use. Press <Enter>.

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1-2-3 FOR WINDOWS

14 BUILD YOUR OWN SMARTICONS

Make your macros accessible by assigning them to custom SmartIcons. First, use *Windows'* Paintbrush or any other paint program to create (or import) a bit-mapped image. Specify a drawing space that's 21 pixels by 21 pixels—the ideal size for a SmartIcon. The small size of the icon means you'll need to keep the drawing very simple. Some type or clip art will do the trick. Usability studies show that color is distracting, so don't make your icon too bright. When you've created the icon, save it in the appropriate *1-2-3 for Windows* subdirectory (either the SHEETICO subdirectory for spreadsheet-related icons or the GRAPHICO subdirectory for graph-related icons).

Now activate *1-2-3 for Windows*, capture your keystrokes as a macro, and then highlight the macro on your worksheet.

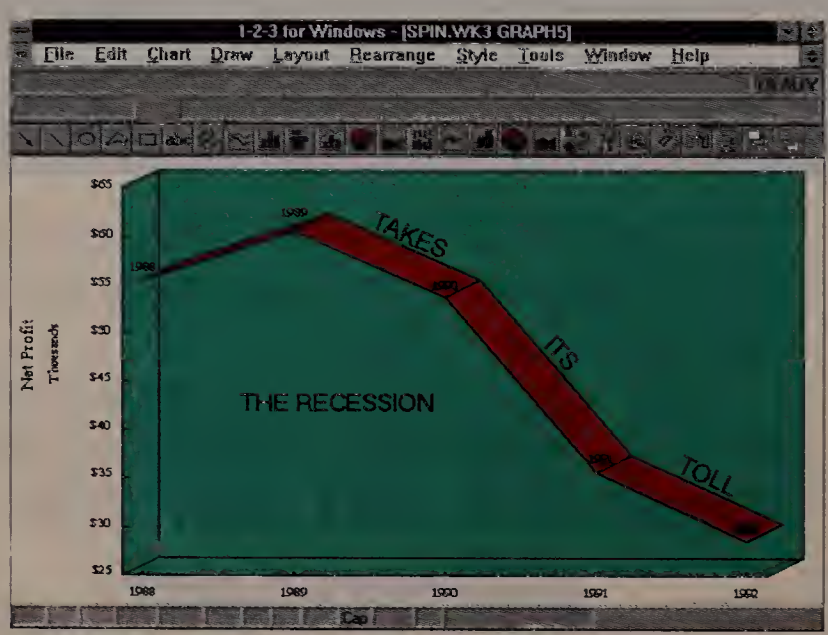
From the menu bar, select *Tools • SmartIcons*. In the SmartIcon dialog box, select *Customize*. Your new custom icon should be in the Custom Icons selection box. Click the custom icon, then click *Assign Macro*. This brings up another dialog box. Click on *Get Macro*, and your macro will be automatically assigned to your custom icon.

15 WARP-SPEED MACROS

You don't have to wait around while *1-2-3 for Windows* updates the screen while running a macro. Speed up macro execution by turning off the screen refresh at the beginning of a long macro, and turn it on again at the end. All you have to do here is insert the toggle switch {WINDOWSOFF} at the beginning and end of your macro.

16 SPIN YOUR TEXT

Unorthodox placement of text on a graph can make charts more interesting (see **SCREEN 3**). In *1-2-3 for Windows*, rotating text is easy. In graph mode, select the *Add Text* SmartIcon from the SmartIcon palette. (If you're not sure which icons do what, hold down the right mouse button while the mouse pointer is on the icon, and *1-2-3* will display a description at the top of the screen.) Enter your text in the pop-up dialog box, and click *OK*. Move the text into position, and click it into place. The text will appear in a selection box. From the icon palette, select the *Free Rotation* SmartIcon. This will let you rotate the text to get the best placement. When you're happy with the placement, click the left mouse button.



SCREEN 3: Unusual text placement can make a simple chart more interesting to look at.

17 UPDATE WORD PROCESSOR DATA

Want to illustrate your documents with tables from *1-2-3 for Windows?* You can use the Clipboard in combination with the Paste Link function in your *Windows* word processor not only to copy from *1-2-3*, but also to create a link that causes the information in your word processor file to automatically reflect any changes you make in the *1-2-3 for Windows* data file.

For example, if you're using *Microsoft Word 2.0*, highlight the table and click on the *Copy to Clipboard* SmartIcon. Activate your *Word* document, and place the cursor where you want the table to appear. Select *Edit • Paste Special*. You'll see a dialog box. ('Formatted Text' will be highlighted in a list of file format choices. Leave it here.) Click on *Paste Link*. Your table will appear in the document. If you make changes to the table in *1-2-3 for Windows*, the table in *Word* will reflect the changes. While the *1-2-3* worksheet doesn't have to be open when you reload the *Word* document, your PATH command does need to include both of their directories or you'll get an error message.

The process is similar for other *Windows* word processors. (In *Ami Pro*, you must first create an empty table in your document for the *1-2-3* table.)

18 FAST SCHEDULES

If you need a consecutive list of dates for scheduling purposes or if you're creating a calendar, *1-2-3 for Windows* will do all the typing for you. To fill the left column with dates starting with, say, June 1, 1992, highlight cells A1 through A30, select *Data • Fill*, and enter

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the first date (**@DATE(92,6,1)**) for the Start value, **1** for the Step value, and something very large (perhaps **99999**) for the Stop value. Use *Range•Format* to indicate what kind of date format you want. If you'd like to fill the left column with 30-minute intervals of time, highlight cells A2 through A20, select *Data•Fill,* and enter **08:00** as the Start value and **00:30** as the Step value. Leave the Stop value as is. Then use *Range•Format* to indicate *Time* as the format.

19 SUM IT UP

You have 50 numbers in column A and 50 numbers in column B. You want to multiply A1 by B1, A2 by B2, A3 by B3, and so on to row 50. Then you want to sum the result of these computations. Sounds like a lot of tedious formula writing. Not so—use the @SUMPRODUCT function to do the whole job for you. In the cell where you want to see the total, type **@SUMPRODUCT(A1..A50,B1..B50)**. *1-2-3 for Windows* will instantly display the result.

QUATTRO PRO 3.0

20 WHERE'S THAT ZERO?

If you type in a ZIP code beginning with zero, *Quattro Pro* will drop the initial zero. One way around this is to type an apostrophe before the ZIP code. If you're entering a lot of addresses, however, this can be a bother. A better way to type in numbers that are not going to be calculated is to use the data entry feature. Highlight the whole column or row where you intend to enter ZIP codes, and select *Database•Data Entry•Labels.* Anything you enter in that block (even nine-digit ZIP codes) will be treated as a label.

21 CREATE COMMAND SHORTCUTS

It's easy to create shortcuts for the commands that you use most frequently. Just highlight the command on the menu, press **<Ctrl>-<Enter>**, then hold down **<Ctrl>** and press any letter. *Quattro Pro* will assign the command to that <Ctrl>*-key* combination so whenever you press it, the command will execute.

To delete a shortcut, highlight the command in the menu and press **<Ctrl>-<Enter> <Delete>**, then **<Delete>** again.

22 THOUGHTFUL MENUS

Do you want *Quattro Pro* to remember the last command you used in each menu and highlight it when you go back to the menu? Just enter the following macro into two cells, and execute it using */Tools•Macro•Execute:*

{/STARTUP;REMEMBER}Y
{/DEFAULTS;UPDATE}

When you use these menus, use **<Ctrl>-<Break>** or **<Esc>** instead of Quit to exit them; otherwise, the Quit command will be highlighted when you next enter them.

23 SIMPLIFY MENUS

You can create a simple menu containing only the commands you use most often. This technique can be especially helpful for novice users who get sidetracked when presented with a myriad of commands.

Choose */Options•Startup•Edit Menus* to reach the Menu Builder. Highlight the command you want to delete. (Press **<Gray Plus>** on the numeric keypad to display the submenu for a command. Press the **<Gray Minus>** key to hide the submenu.) Press **<Delete>** to erase the command. When you're done, choose */Save* and enter the name you'd like to use for the new menu tree. (*Quattro Pro* automatically adds the file extension MU to the name.) Then choose */Quit* to return to the spreadsheet.

To use the new menu tree, choose */Options•Startup•Menu Tree* and choose the menu tree's name from the list. To set this menu as the default from now on, choose */Option • Update.*

25 MENU TRICKS

Three tricks to make your menus perform: If you want to return to the worksheet from several levels into the menu tree, use **<Ctrl>-<Break>** instead of backing out with Quit or <Esc>. If you prefer narrower menus: Press **<Gray Minus>** while the menu is displayed. To make them wider, use **<Gray Plus>**. To get the menu off of the data you want to look at without losing your place in the menu, press **<F6>** to temporarily hide it. Press **<F6>** again, and the menu reappears.

BONUS TIP

QUATTRO PRO 4.0

24 QUICK SUMS

Projects often span several worksheets. For instance, if you're evaluating the budgets of various departments for an entire quarter, you might collect data from worksheets for each month in a new worksheet for the quarter. If all your spreadsheets follow the same format, you can do this quickly with *Quattro Pro for Windows'* notebook feature and the 3-D TurboSum feature. The notebook feature allows you to group up to 256 worksheets (pages) together. The pages' names appear on tabs arranged below the worksheets.

Create a notebook containing the monthly worksheets. Say you have three pages in your notebook named Jan, Feb, and Mar and that you want to collect the total budget for all departments into a new page named Q1. In Jan, highlight the range of data you want to sum. Hold down <Shift>, click on the tab for Jan, then click on the tab for Q1. Press the TurboSum button, and *Quattro Pro for Windows* will add the data from all three monthly pages and put the totals in Q1.

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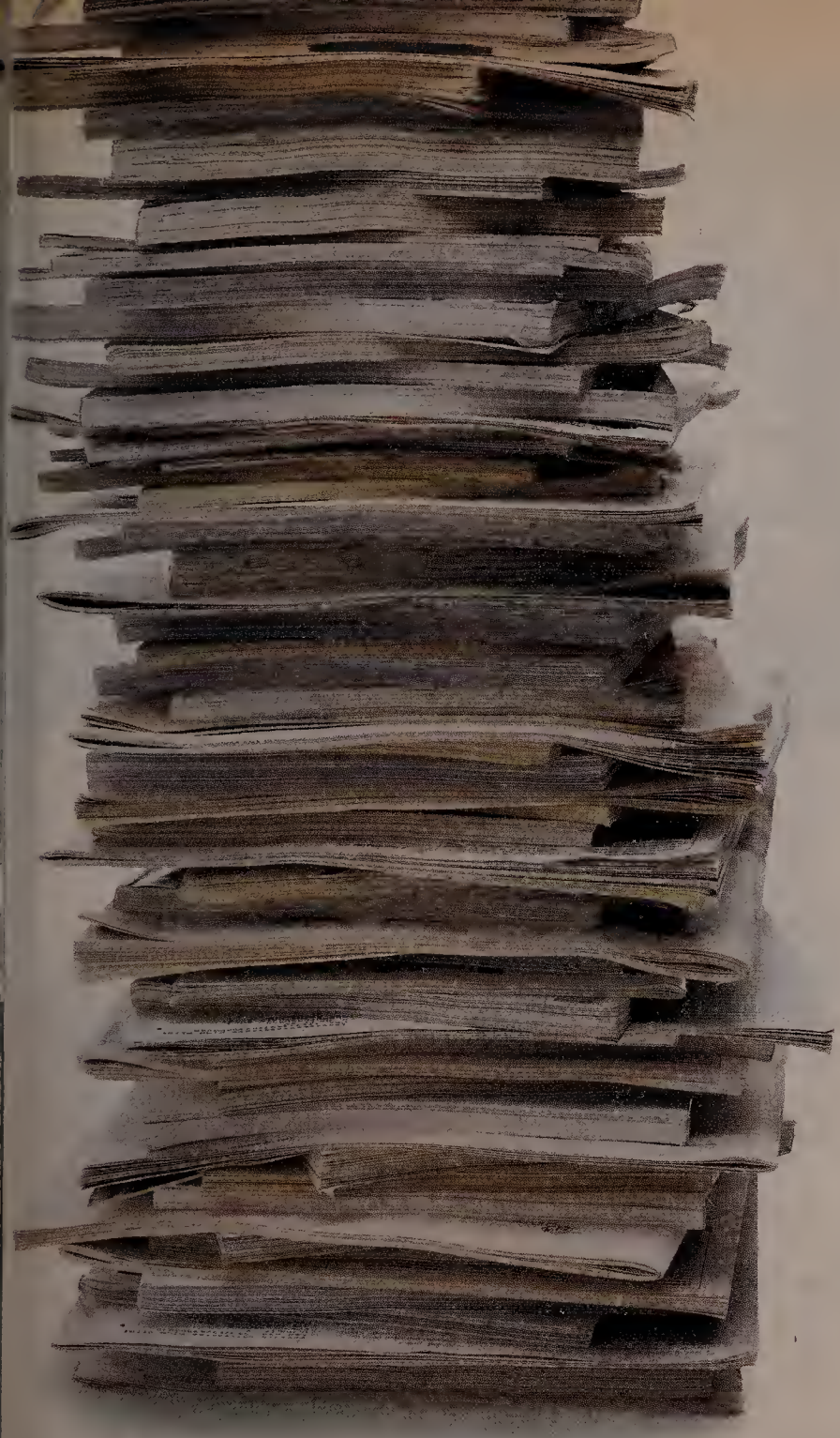

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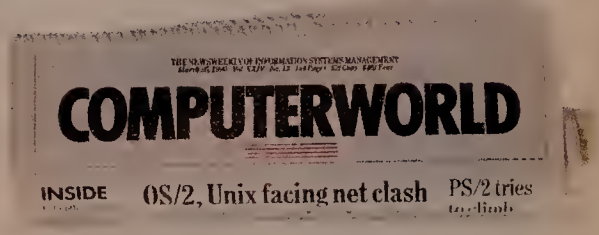

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26 A FAST ESCAPE

Do you jump into *Quattro Pro* to find data or do calculations and then close it to go back to what you were doing? You can save yourself some keystrokes or mouse time by modifying one of the buttons in the Mouse Palette on the right side of the screen to exit the program.

Select *Options • Mouse Palette*, and choose a button to modify. Be careful here, because the buttons are already programmed to do other things. The 5 button only beeps, so it's a good choice. Click on *Text*, and give the button a three-letter name. Then select *Macro* to tell the button what to do. Type in **FX** (for *File • Exit*), and click on *Quit* to back out of the menu tree. Any of these buttons can be reprogrammed; just be sure you don't need them for their original function.

BONUS TIP

QUATTRO PRO 4.0

27 THINKING GRAPHS

One of the exciting new features of *Quattro Pro 4.0* is its capability to perform advanced analytical functions on spreadsheets and display the results in a chart. Less obvious is the program's ability to display the results of analysis in the worksheet. For example, to collect the daily sales figures from a spreadsheet and show the monthly sales totals, select */Graph • Series • 1st Series*. Indicate the range of cells you want to analyze, and press <Enter>. Select */Graph • Series • Analyze • 1st Series • Aggregation*. Choose *Days* as the Series Period and *Months* as the Aggregation Period. Select */Analyze • 1st Series • Table*, indicate where in the worksheet you want the data to appear, and then press <Enter>.

28 SEPARATE DEFAULTS

Ever wish you could have more than one group of default settings? Perhaps you usually print to a laser printer in portrait orientation but sometimes print to a dot matrix in landscape. You *can* create separate default files. Set the options for your secondary default, then choose */Options • Update*. *Quattro Pro* stores these settings to a file named RSC.RF. In DOS, copy the RSC.RF file to a different file name (like **LANDSCAP.RF**) but keep the RF extension (don't move the new file to another directory). Return to *Quattro Pro*, reset the options for your normal default (portrait orientation), and issue */Options • Update* again.

To use *Quattro Pro* with the special settings, start the program with the command **Q /D***filename*, where *filename* is the name of your RF file (**Q /DLANDSCAP.RF**, for example). You can create a batch file to load the alternate RF file automatically with *Quattro Pro*. For instance, store the line **Q /DLANDSCAP.RF** in a file called LANDSCAP.BAT. Then enter the command **LANDSCAP** at the DOS prompt to load *Quattro Pro* with the landscape-printing default.

29 LOAD IT WITH BULLETS

You can insert some flashy-looking bullets into your spreadsheets with **\bullet** *x*\. Replace the *x* with a number from 0 to 6 (see **TABLE 1**). If the bullet command is the first thing in your cell entry, be sure to precede it with a label prefix code (', ", or ^) or *Quattro Pro* will think it's a repeating-character command. If you're working in text mode, the bullet will appear as code. If you're working in WYSIWYG mode, the bullet will show on screen. It will show on your printout in any case.

Bullet	Command
□	'\bullet 0\
■	'\bullet 1\
☑	'\bullet 2\
✓	'\bullet 3\
▢	'\bullet 4\
☑	'\bullet 5\
●	'\bullet 6\

TABLE 1: Spice up Quattro Pro spreadsheets with one of these bullets.

30 ADD REASON TO YOUR FORMULAS

Anyone who shares spreadsheets knows what a headache it can be to decipher a long formula that someone else (or even you) wrote. You can save everyone the trouble by adding nonprinting comments. Type a semicolon (;) after the formula. *Quattro Pro* ignores any text after the semicolon when the formula calculates but displays it when you highlight that cell.

31 COMBINE LABELS WITH FORMULAS

You use formulas to add up rows of numbers, but you can also use them to consolidate text from far-flung cells. Just use an ampersand (&) to connect text values. For example, **+"Dear "&C6** joins the label 'Dear' with the text in cell C6. (If C6 contains a value, *Quattro Pro* returns 'ERR'.) Enclose any text in the formula (including spaces you want to insert between the text values) in quotes. For example, if you want to address a spreadsheet to all the people who are named in cells G1 through G3 and you want a comma and a space after every name, enter **+"To: "&G1&", "&G2&", "&G3**.

32 EIGHT DAYS A WEEK

How quickly can you figure out on what day your Great Uncle Roy's birthday fell in the year 1908? Dazzle your friends with the formula **@CHOOSE(@MOD(A1,7), "Sat", "Sun", "Mon", "Tue", "Wed", "Thu", "Fri")** in cell A2. Then in cell A1 enter Great Uncle Roy's birthday or any day from March 1, 1900, on. Say the birthday was June 1, 1908; you'd type **@DATE(8,6,1)**. *Quattro Pro* will do the calculations and put 'MON)' in cell A2. (This formula works in *1-2-3* as well.)

33 ADJUST COLUMN WIDTHS

You have a long column of cells filled with text and data of varying lengths. Some fit easily into the column, and some spill over or are truncated by the next column. Don't waste time scrolling down the column to see which column width gets everything in. Use */Style • Block Widths • Auto Width*. Each column in the block you specify will be set to a width determined by that column's longest entry.

34 HIDE ZERO VALUES

You've created a spreadsheet full of formulas, but you don't have the data to fill it out yet.

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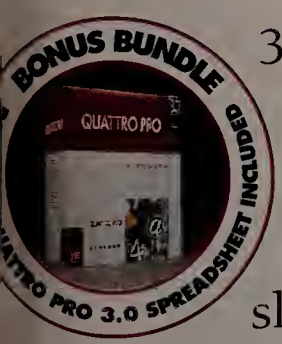

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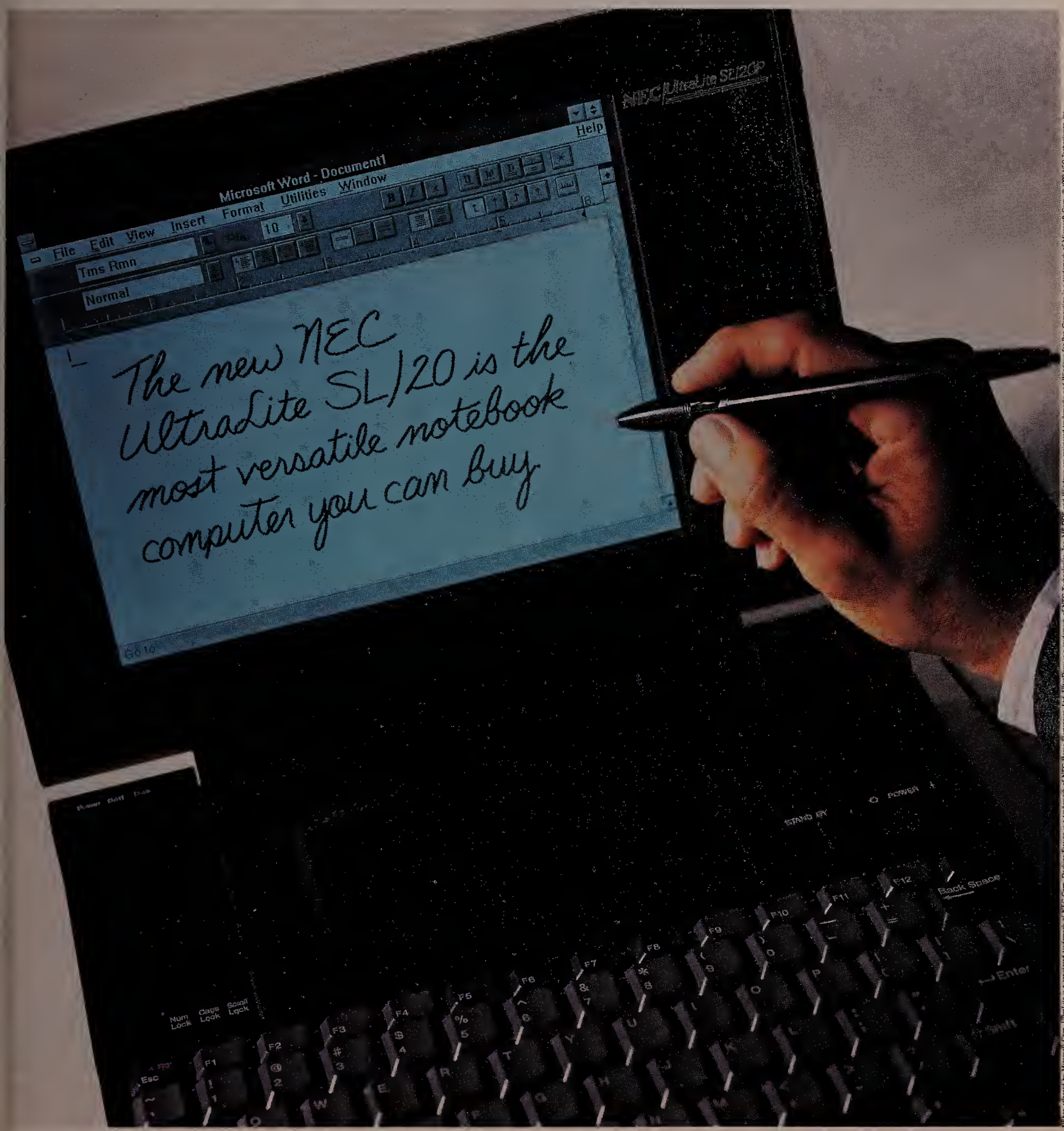

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Rather than show pages of zeros, you can set up the spreadsheet so the zeros don't show. Select */Options • Formats • Hide Zeros • Yes.* Then if a formula results in zero, only an empty cell will show. (You might want to protect these seemingly empty cells to make sure they don't accidentally get written over: Choose */Style • Protection • Protect,* and specify the cells you want to protect.) Use */Options • Update* to always hide the zeros. Or if you want to see the zeros on screen but not on your printout, write a print macro that hides the zeros, prints the sheet, and then redisplays the zeros.

EXCEL 3.0

35 DOUBLE-CLICK BEST FIT

A slick way to fine-tune a column's width is to double-click on the column heading's right border. *Excel* will automatically adjust the width of the column to accommodate its longest entry. You can also highlight several columns (or the whole worksheet) and double-click on the right border of any of those column headings. *Excel* will "best fit" them all.

36 WRAP TEXT IN A CELL

If you want to write a long paragraph and have it fit in (wrap down) a cell, type in your text and highlight the cell or cells. Then choose *Format • Alignment,* and check the Wrap Text box. *Excel* will now fit your text into the cell at whatever width you set. If you make the column wider after you've wrapped text, you'll notice that the column height doesn't shrink. Double-click on the bottom edge of the row heading to resize row height.

BONUS TIP

EXCEL 4.0

37 FILL 'ER UP

Excel 4.0's Autofill function will write formulas for you. For example, if you want a list of months, type JAN in cell A1 and FEB in cell A2. Highlight both cells. At the bottom right-hand corner of the highlighted box, a square handle appears. Drag this handle down until you've highlighted cells A1 through A12. *Excel* will fill in the rest of the month names for the year. Try this with other formulas. *Excel* will fill cells with its best guess. For example, type 100 in one cell, and 110 in the next. Highlight both cells, and fill any number of adjacent cells. *Excel 4.0* will assume you're looking for a 10 percent linear increase and will project this to all the highlighted cells.

38 QUICK DATA ENTRY

Does it drive you crazy to have to press <Enter> and then <Down> to type data down a column? There are easier ways. If you usually enter data down columns, you can change the default so that *Excel* automatically moves down one cell when you press <Enter>: Select *Options • Workspace,* and check the Move Selection After Enter box.

Or if you want to type into a group of cells, highlight the area into which you want to enter text. Type your data in the first highlighted cell, and press <Enter>. The cursor will move down to the end of the highlighted area, and then it will jump up to the top of the next highlighted column. Use <Shift>-<Enter> to move backward. To move across a row and then down, use <Tab>. Use <Shift>-<Tab> to reverse.

39 COMMON GROUND

Your sprawling spreadsheet contains statistics on all 500 of your employees. To find Bob Jones's start date, you have to scroll through endless columns and rows, right? Wrong: You can use the intersect function. Highlight the row containing data on Bob Jones, select *Formula • Define Name,* and type **BOB** to name the row. Then name the column containing start dates **START**. In a cell, type **=BOB START**. *Excel* will find Bob's start date instantly. You can name any group of cells and ask *Excel* to find the common data.

40 BUILD YOUR OWN TEMPLATES

Templates can contain formatting, macros, formulas, or whatever you like. When you open a template, *Excel* treats it like a blank worksheet. When you save your changes, *Excel* will ask you to name the worksheet and won't overwrite the template in the process. To create a template, open a new worksheet and enter the formatting, formulas, and/or other defaults you want it to contain. Then select *File • Save As • Options.* You will see the Options dialog box. Select *Template* from the File Format box. Name the template and click *OK. Excel* will give it the extension XLT.

41 CUSTOMIZE YOUR WORKPLACE

If you always use the same format or formats, you can customize the blank worksheet that *Excel* opens when you load it. Format a worksheet or worksheets or macro sheets as you like them, and save them as templates (see the tip "Build Your Own Templates" above) in the *Excel* directory XLSTART. Every time you load *Excel,* it will open everything in the XLSTART directory (files, templates, macro sheets—everything).

If you prefer to have an

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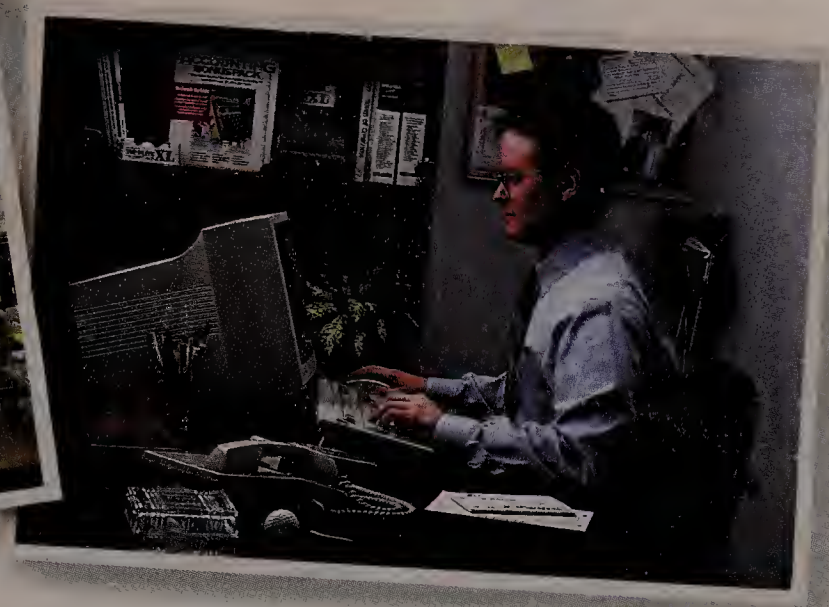

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DacEasy's logical interface and complete on-line, context sensitive help make it easy to learn and use. And the simple point-and-shoot mouse environment with transaction-oriented, pull-down menus is friendly to even the most novice of users.

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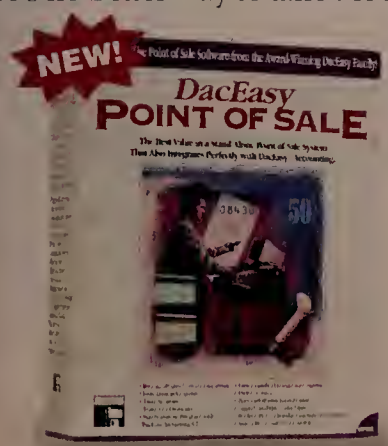

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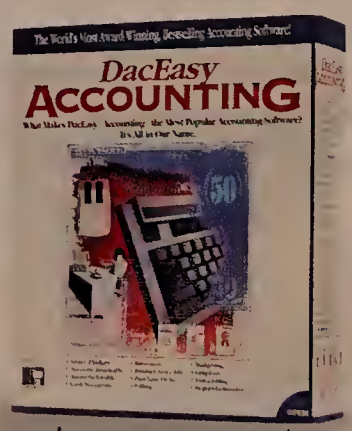

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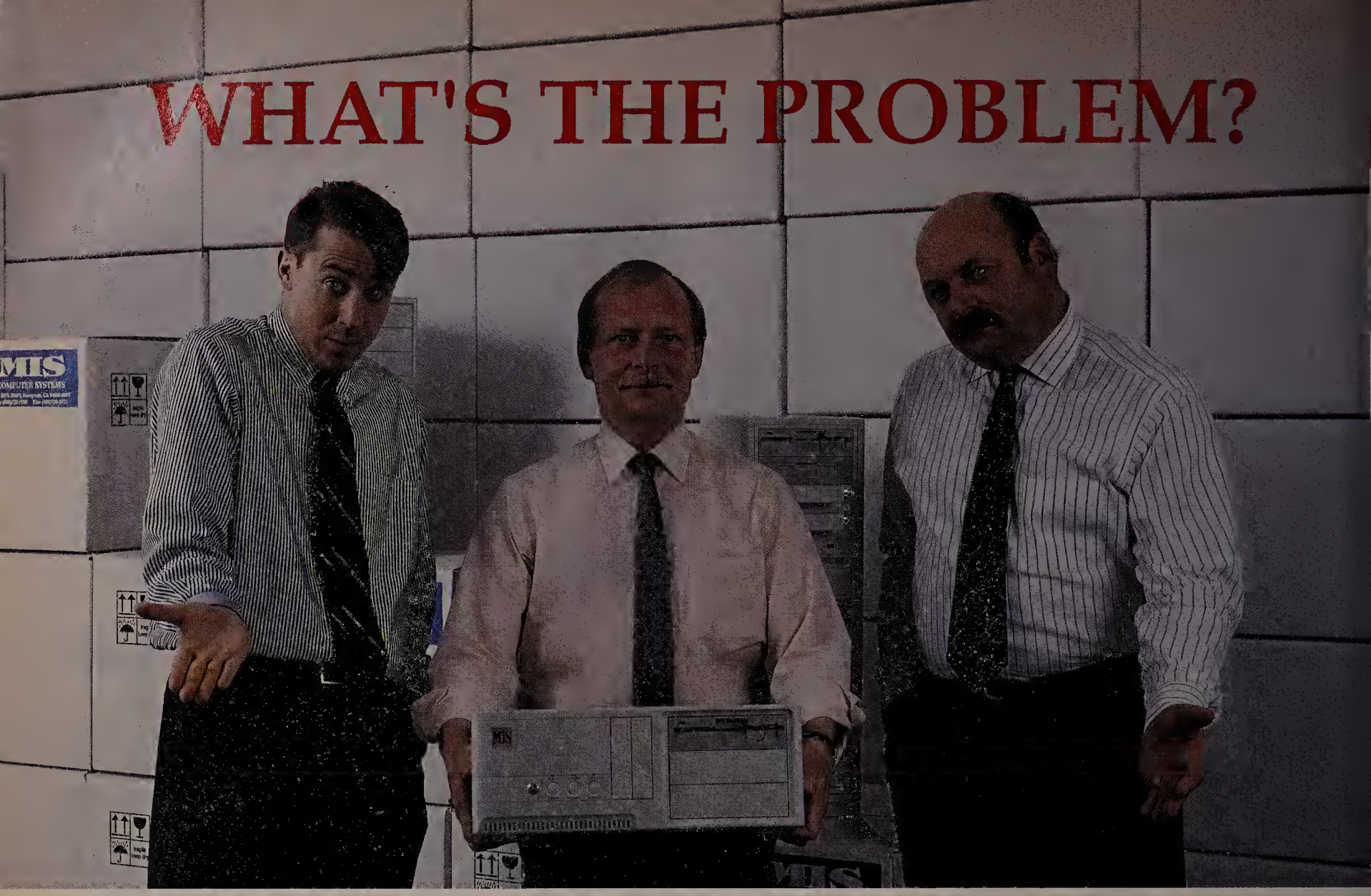

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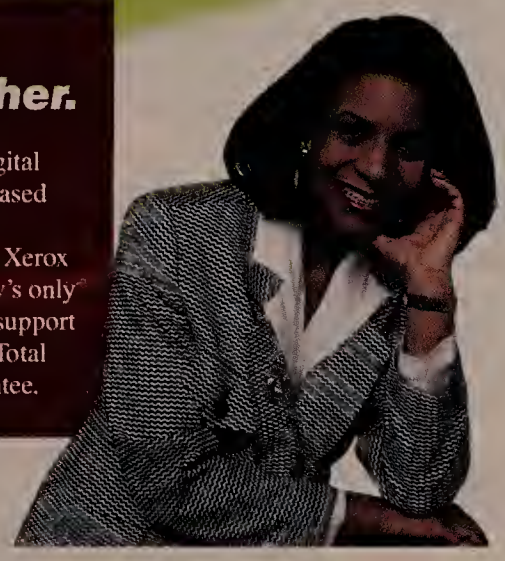

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empty work space with no worksheet at all, load *Excel* using **EXCEL/E**. You can issue that command at the DOS prompt or after selecting *File•Run* in *Windows*. (Or create an icon in *Windows* to do this for you. See the tip "Personal Icons" below.) You can also load *Excel* using **EXCEL /P** *directory*, where *directory* is the default where *Excel* looks for your files.

42 MAKING PICTURE CHARTS

If you're making a presentation of chicken sales, wouldn't a chart that stacks up chickens look better than a plain column? You can import your own graphic from any *Windows* graphics application. Open *Windows'* Paintbrush or another graphics package, and highlight the image you want. Select *Edit•Copy*. Activate *Excel*, and open the file containing your chart. Click on the column, and select *Edit•Paste*. *Excel* replaces your column with chickens (see **SCREEN 4**). Decide whether you want the chickens stacked up or stretched tall. Select *Format•Patterns* (or just double-click on the column), and pick the format you prefer.

43 PERSONAL ICONS

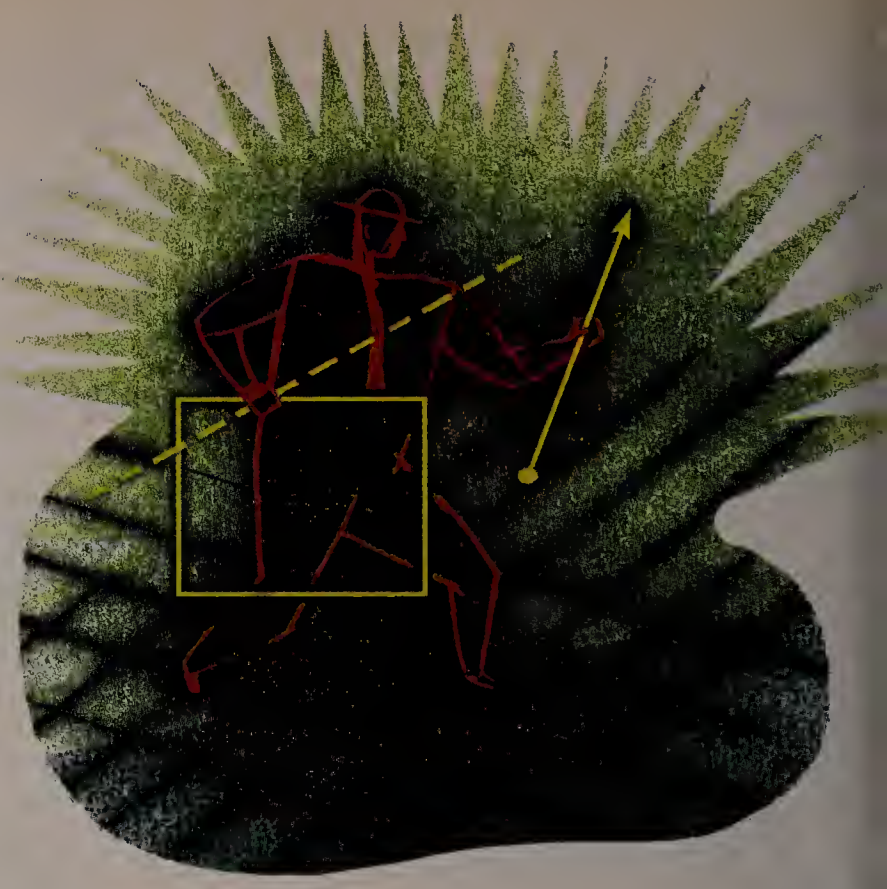
If you work on long, complicated projects, it can be useful to create an icon in *Windows* that launches *Excel* and opens all the associated files. In *Windows*, select *File•New•Program Item•OK*. In the Description box, type a name for your project. In the Command Line box, type **EXCEL**, a space, and the names of all the files (with one space between them) that you want *Excel* to open when you click on this icon. You don't need to include the XLS extension, but be sure to include the path for each file. Then click on *Select Icon* to choose an icon for the project. If *Windows* doesn't display any icons you like, type **PROGMAN** in the File Name box, and click on *View Next* to see a selection of more *Windows* icons. Or if you want to give your files an *Excel* icon, type **EXCEL.EXE** in the File Name box.

44 SELECT ONLY VISIBLE CELLS

Say you have a spreadsheet with several years of monthly sales figures and yearly summaries. You want to create a chart showing only the year-end figures. If you hide the cells that contain the monthly figures, select the visible cells (the year-end figures), and create a column chart, it will contain a column for every month of every year as well as the year-end figures—ugly and not what you want. But if you click on the tool bar's *Select Only Visible Cells* button, the chart you create will reflect just the visible cells.

45 LINE UP BUTTONS

Excel 3.0 enables you to insert graphical objects such as lines, arrows, boxes, and macro buttons in a worksheet. These can enhance the look of a finished report, but if they're misaligned the result can be an unprofessional mess. Fortunately, *Excel* has a snap-to feature that aligns objects with grid lines in your worksheet. Once you've finished drawing the object, hold down **<Alt>** and use the left mouse button to drag the object. Instead of moving freely, the graphic will automatically align with the cells in its path.



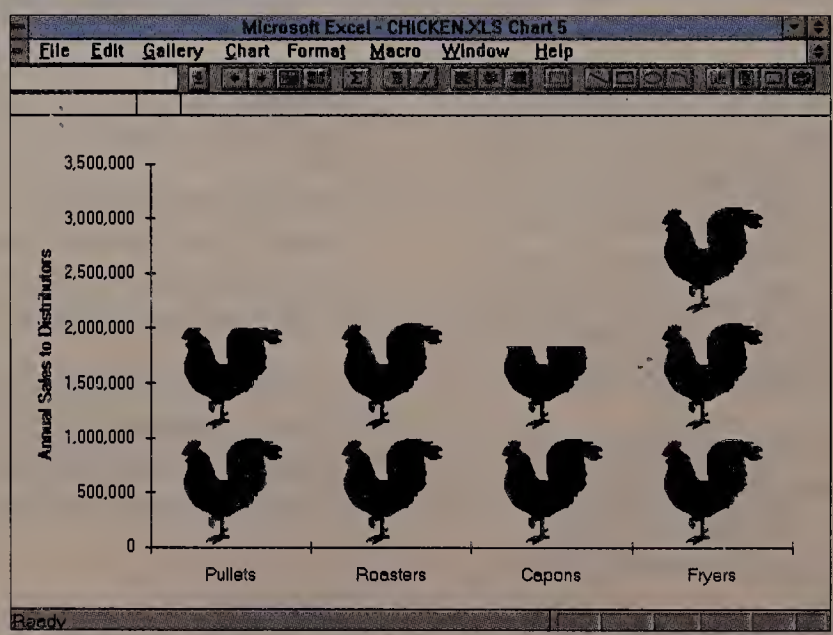
46 TEACH EXCEL TO TYPE FOR YOU

When entering numbers that aren't going to be calculated, such as phone numbers, ZIP codes, and Social Security numbers, you can save yourself work by creating custom number formats. First, select the cells where the numbers will be entered. Choose *Format•Number*, then press **<Tab>** or use the mouse to highlight the Format box. Simply type in your format and click *OK*.

For phone numbers, type **(000) 000-0000**. When you type a phone number into these cells, just type the numbers; *Excel* will add the parentheses and hyphen.

For ZIP codes, type **00000-0000**. *Excel* will stop dropping that initial zero and insert a hyphen for nine-digit ZIP codes.

For Social Security numbers, type **000-00-0000**. You won't need to type the hyphens when you enter your data.



SCREEN 4: Picture charts tell a story more effectively than simple bar charts.

47 THE LASERJET III AND EXCEL 3.0

Some copies of *Excel 3.0* refuse to print in landscape mode to a Hewlett-Packard LaserJet III. Version 3.86 of the Hewlett-Packard printer driver will fix this problem. It's available free if you call 303/353-7650, and it's also available from the HP forum of CompuServe.

If you want to print right this minute in landscape and can't wait until you get your

new printer driver, go into *Windows 3.0*'s Control Panel, select *Printers • Configure • Setup,* and set Graphics Resolution to 75 dots per inch. Then launch *Excel,* select *File • Printer Setup,* and select *Setup* from that dialog box. *Excel* will give you a message directing you to *Page Setup.* Click *OK.* You'll get a new dialog box. Set Graphics Resolution back to 300 dots per inch, and click *OK.* You can now print in landscape. But be sure to install your new printer driver soon.

48 NAVIGATING IN EXCEL

Excel remembers where you were whenever you jump to a distant section of the worksheet with the Goto key (<F5>). Press **<F5>**. You'll get a dialog box asking you where you want to go. Type in the cell address of your destination. When you're finished at that location, press **<F5>** again. *Excel* remembers your previous location, so all you have to do is press **<Enter>** to return to your place of origin. This feature works between worksheets as well.

49 UPDATE FILES AUTOMATICALLY

It's drudgery to type a column of months for your sales projections and then retype them every quarter. Here's a formula that generates a list of months and updates them if you change the first one.

Highlight the first column. Select *Format • Number,* and select a date format. If you want a custom date format that types the full month name and the year (June 1992, for example) type **MMMM YYYY** in the Format box and click *OK.*

Symbol	ASCII code
~	126
æ	145
Æ	146
¢	155
£	156
¥	157
«	174
»	175
¿	168
¡	173

TABLE 2: Some commonly used symbols, with their ASCII codes, that you can add to your spreadsheets.

In cell A1, type the first date: **6/1/92** (this will appear as June 1992 if you made your own date format). In cell A2, type **=DATE(YEAR(A1),MONTH(A1)+1,1)**. Highlight A2 and all the cells below it where you want dates to appear. Select *Edit • Fill Down. Excel* will fill in all the dates. If you change the date in the first cell, *Excel* will update all the rest.

50 SYMBOLS AND FOREIGN TEXT

To enter foreign characters and symbols into your spreadsheets, use the ASCII *Windows* character set in **TABLE 2** (for a complete listing, look in your DOS manual or any complete computer reference book). Just hold down **<Alt>**, type in the appropriate three-digit code on the numeric keypad, and release the <Alt> key. For example, you would type **<Alt>-<Numpad 168>** to get an upside-down question mark, **<Alt>-<Numpad 156>** for a British pound sterling sign, and **<Alt>-<Numpad 157>** for a yen symbol. The ASCII technique also works in the DOS versions of *1-2-3* and *Quattro Pro* (in character mode and for draft printing).

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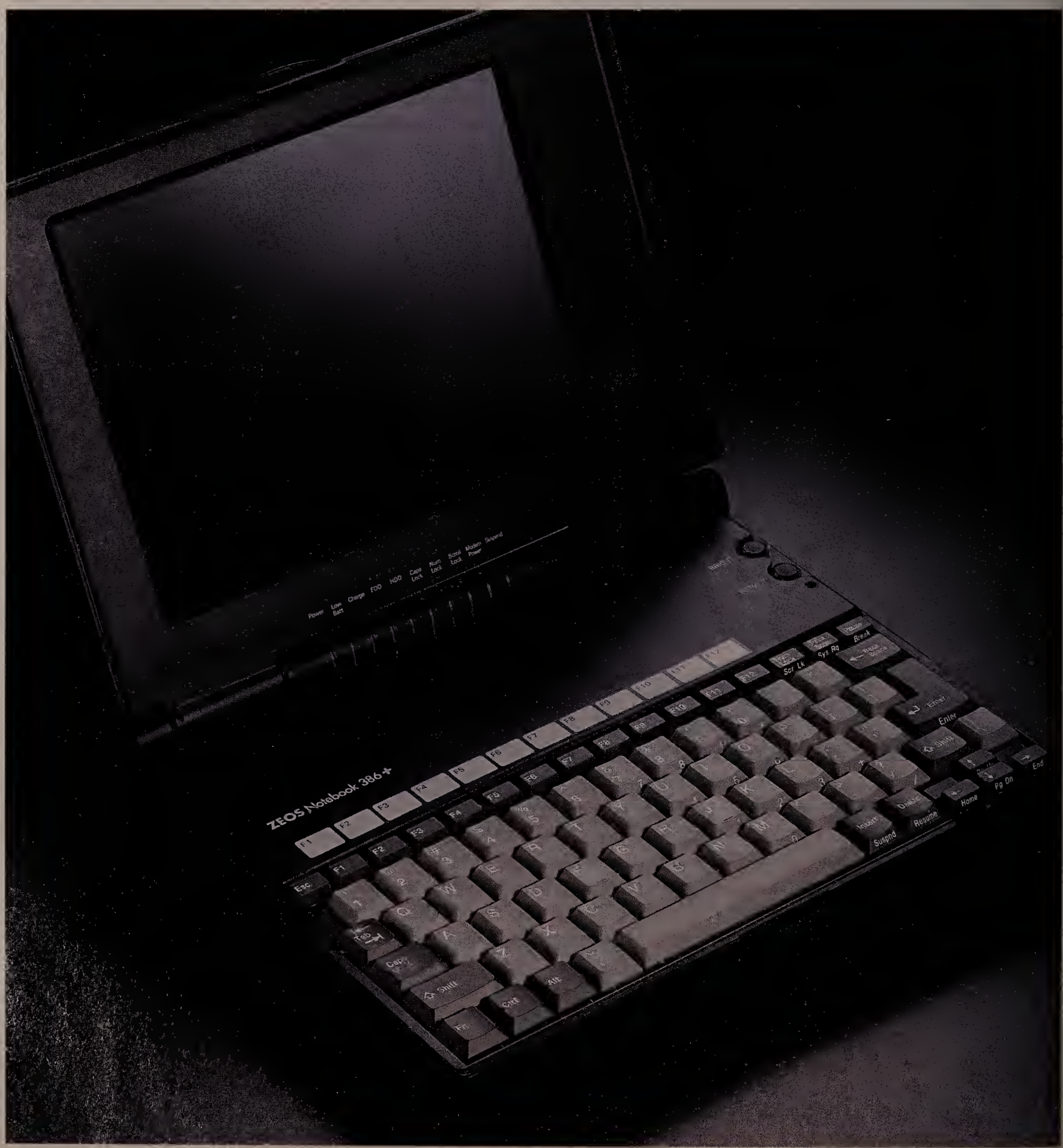

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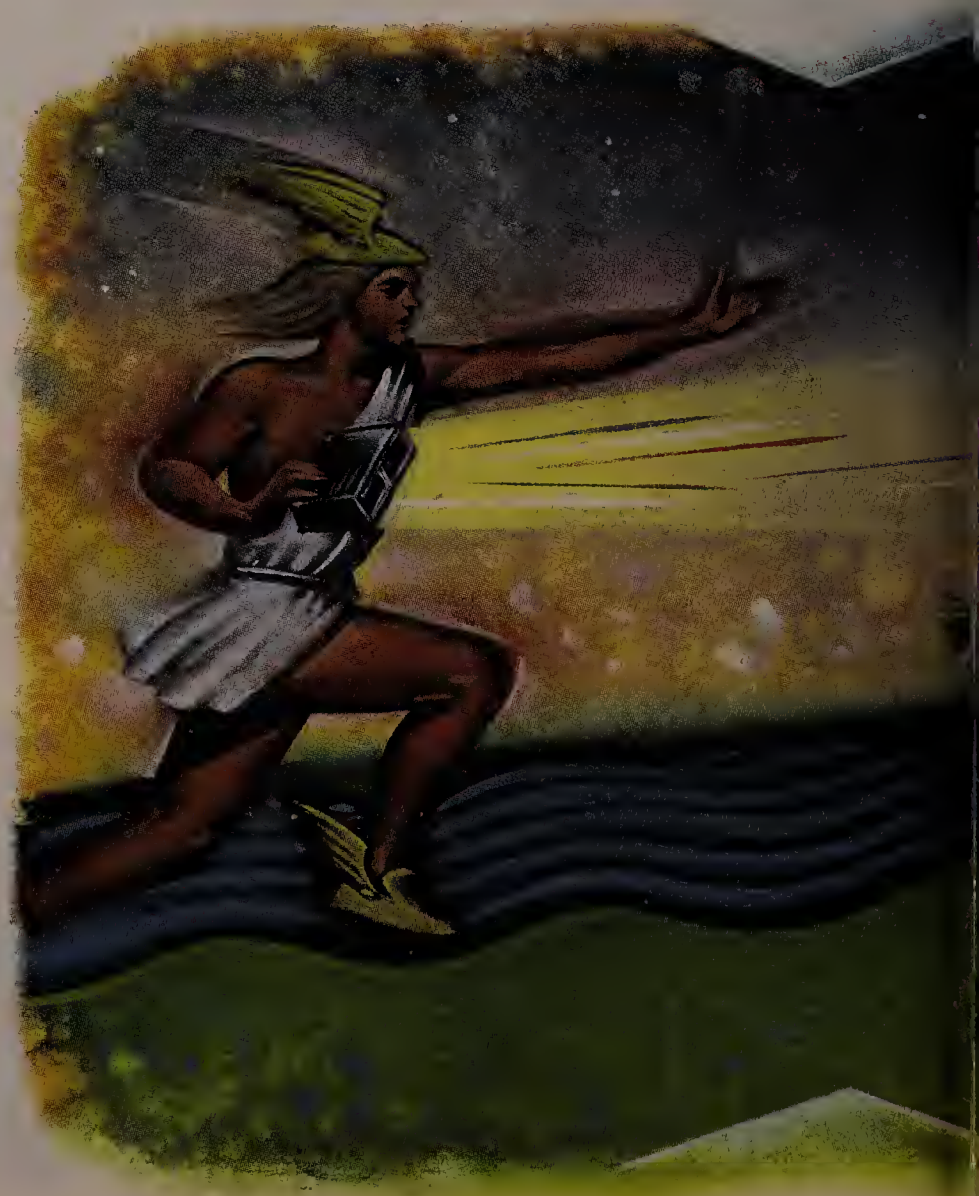
HIGH-SPEED MODEMS

V.32bis modems—the fastest ones around—are also surprisingly affordable. Many give you the latest, fastest fax as well.

If you've racked up big phone and on-line charges uploading or downloading data files or waiting for your screen to redraw in remote access programs, it's time to kiss your 2400-baud modem good-bye. New, inexpensive high-speed modems let you send data error free. Only a few years ago, high-speed modems cost thousands of dollars, but new chips and standards have changed all that. Since our December buyers' guide, which covered both 9600-baud V.32 modems and the faster 14,400-baud V.32bis modems, dozens of new models have hit the streets. As a result, the average list price of a V.32bis modem has dropped nearly 30 percent to about $700, with some selling for as little as $180.

This time we're limiting our coverage to V.32bis modems. To make the cut, each



BY BRETT GLASS

modem had to have a list price of $1200 or less and include MNP-4 and V.42 error correction and MNP-5 and V.42bis data compression. Even with these restrictions, we turned up more than 80 units. What's more, many of these hot new modems also include fax capability, and about half the fax-modems listed offer the new high-speed V.17 protocol for faxing documents at 14,400 baud. (They'll also slow down to talk to slower 9600- and 4800-baud fax devices.)

THERE'S FAST, AND THEN THERE'S FAST

Running V.42bis compression, these V.32bis modems can theoretically transfer data at close to 57,600 baud—50 percent faster than V.32/V.42bis modems, which max out at 38,400 baud. In the real world, noisy line conditions drop those modem-to-modem figures to about 38,000 and 30,000 baud, respectively. Actual data throughput from one PC's hard disk to another is much less, depending on the PC's speed and serial interface, the communications software, and the type of data you're sending (see "How to Keep Your Fast Modem Fast").

If you sent equal amounts of text, graphics, data base, binary, and Zip (software-compressed) data, you'd see average throughput of about 20,000 baud for V.32bis and 17,000 baud for V.32. Yet, with the most commonly transferred file types—text and Zip—V.32bis gives you a 30 percent increase in data throughput over V.32. This is important because many users routinely Zip groups of files before sending them, and most files available for downloading on BBS's are Zip'd.

That 30 percent improvement looks attractive when you consider that V.32bis modems cost only 10 to 20 percent more than similar V.32 modems. V.32bis also handles bad telephone connections better—as with V.32, the modem slows down when line noise worsens, but it will also speed up again if the line improves.

WHERE HIGH SPEED PAYS OFF

If you rarely transfer files, or are on a tight budget, you're probably better off with a 2400-baud modem, which you can find for as low as $75. But considering the low cost of V.32bis modems, it's hard not to recommend them to just about anybody. Here are some situations where V.32bis can really pay off:

PC-to-PC file transfers. If your branch offices exchange data frequently, buy a V.32bis modem for every node and watch on-line costs plummet. A V.32bis modem is especially effective for transferring the large files created by *Windows* programs.

Remote communications. Controlling a remote PC via a program such as *PCAnywhere* calls for a high-speed modem. This is especially true if you're running graphical environments such as *Windows* remotely, in which case 9600 baud is almost a must. The more your screen redraws, the more you'll benefit.

BBS transfers. Approximately 25 percent of all BBS's offer V.32 or V.32bis access lines. If you're downloading files from a BBS you call directly, you can take full advantage of your modem's capabilities without packet networks and high-speed surcharges.

Micro-to-mainframe links. V.32 and V.32bis modems are common in the mainframe world,

CARY HENRIE

so if you're using your PC as a terminal to connect to an interactive system such as a company minicomputer or mainframe, chances are you can log in at 9600 or even 14,400 baud. This will help the host repaint your screen as quickly as possible.

Network-to-network transfers. As LAN E-mail proliferates, more and more companies need to transfer E-mail automatically between branch offices. For instance, if you have several "post offices" running *cc:Mail* and swapping large quantities of data, a faster modem will cut your phone charges.

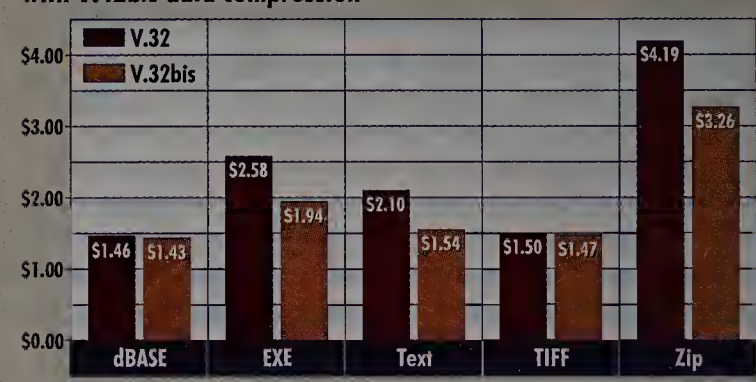
ON-LINE SERVICES LAG BEHIND

Although V.32bis modems are backward compatible—they can slow down to communicate with 9600-, 2400-, and 1200-baud modems—they won't really pay off unless there's another V.32bis modem (or at least a V.32 modem) at the other end. This might be a problem in the short term if you spend a lot of time using on-line services. While some BBS's, such as CompuServe and GEnie, have recently added 9600-baud access to their services, 14,400-baud (V.32bis) access is currently available only on BIX (see "On-Line Services Inch Toward Higher Speeds").

Some on-line services levy stiff surcharges for high-speed use. CompuServe, for example, charges $10 extra per hour. This still doesn't sound like a bad deal—four times the speed for only twice the cost—until you figure in some other factors. First, you'll encounter long pauses as you switch from forum to forum (especially when the service is busy); during those times the meter is tallying charges much faster. And if you're interacting directly with the system (rather than through an automatic access program such as *TAPCIS*), you may find your typing and decision-making time are the major sources of delay, causing you to spend the same amount of time on line but at a higher

Cost per Megabyte: V.32 vs. V.32bis

with V.42bis data compression



In our tests simulating real-world line conditions, modems equipped with V.32bis and V.42bis saved money by transferring files up to 30 percent faster (depending on file type) than modems using the older V.32 standard (also with V.42bis). This graph shows the relative cost per megabyte for file transfers between New York and California, assuming a daytime long-distance rate of $0.245 per minute. A V.32bis modem yields significant savings over V.32, especially on text, executables, and noncompressible Zip files. Differences narrow if you send uncompressed data base or graphics files because V.42bis compresses more at slower transmission speeds, helping to equalize total throughput.

How to Keep Your Fast Modem Fast

The V.32bis modems listed here are plenty fast, but real-life transmission speeds are less than half the 57,600-baud rate claimed by the vendors. What gives? The difference is due primarily to five factors; some you can control, others you can't.

■ **Error correction overhead.** Regardless of modem speed, error correction (V.42 or MNP-4) slows transmissions a bit. But since more errors crop up at higher speeds, the percentage of overhead is larger for fast modems. Still, error correction isn't a feature you'd want to give up.

■ **Inconsistent compression.** Not all file types are equally compressible. Even when the file that's transmitted is an easily compressible text file, you won't get the 4-to-1 compression that V.42bis claims. The gain is likely to be least when you're transferring a file that's already compressed, such as a Zip file.

■ **Handshaking overhead.** The computers must exchange handshaking signals with the modems, throttling incoming data so that none is lost. This process adds to the amount of data being transferred, slowing throughput. When a modem's running at 2400 baud, it matters little whether you've got an old PC or a 486. But at high speeds, slower processors can really drag you down—a 386 speeds communications considerably, and you may even notice the difference between a 386 and a 486.

■ **Serial interface overhead.** The architecture of the PC requires that the serial interface or a modem card supply a chip called a UART, which is compatible with the ones on the earliest PCs. UARTs limit the speed by forcing the PC to remove bytes from the serial port one at a time. If you buy one of the approximately 10 percent of PCs that include a 16550 UART, your PC can remove bytes several at a time, so performance should improve. If your system lacks a 16550, you can buy a special interface card, such as Hayes' ESP board, that includes one.

■ **Software performance.** Most DOS-based communications packages are similar in performance when handling high-speed modems, but they all incur overhead, especially with older file transfer protocols such as XMODEM. FAST, YMODEM-G, and ZMODEM, for example, are better optimized for high-speed modems. Remote communications packages such as *Carbon Copy* vary considerably in speed. *Windows* always reduces data throughput, especially when you multitask DOS communications software. *Windows 3.1* supports the 16550 UART, so if your PC is equipped with that chip, you'll see a small improvement.

The Great Crash Of '91.

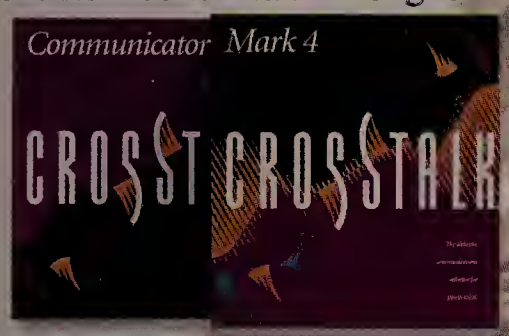
Not long ago, the PC world was shaken by the news that a surprisingly well-known communications package had crashed while attempting high-speed file transfers. It was not a pretty sight.

After testing different comm programs, the editors of *PC Magazine* reported that "*Procomm Plus*® locked up several times during our testing of high-speed file transfers. During our Character-based ZModem tests, on an 8-MHz AT equipped with a 16550A UART, it consistently froze at every port speed faster than 38.4 Kbps on the receiving side of the link."

This episode proved that you can't be too careful before investing in comm software. It also proved, once again, that you can't go wrong with Crosstalk.®

Crosstalk Cruises Through High-Speed Tests.

Not only was Crosstalk the one consistent benchmark throughout the



PC Magazine tests, but it was one which the editors of *PC Magazine* applauded for performance, price and flexibility.

As for the feature-rich Crosstalk Mark 4, the editors commented that "...it's a real bargain for all it accomplishes. Corporate managers who require features like a powerful script language, a variety of terminal emulation selections, and network communications capabilities will appreciate this product."

The editors of *Software Digest* drew a similar conclusion. They gave Crosstalk Mark 4 the only 4-star rating in their ranking of communications packages. And while Crosstalk Mark 4 proved to be an unparalleled program for power users, its sister product, Crosstalk Communicator, also scored highly in the *PC Magazine* tests.

Crosstalk Communicator received points for "...matching its higher-end sibling, *Crosstalk Mark 4,* practically score for score." It provides "...a fast, flexible alternative for the budget-conscious, particularly anyone in an organization already using *Crosstalk Mark 4,* because it can use scripts developed in that program."

Between the two of them, Crosstalk Mark 4 and Crosstalk Communicator can cover virtually any communications need you have.

Why Risk It?

So, before you risk a high-speed crash, take some free advice. Get your free working model of Crosstalk Communicator. You'll see how easy it is to get up and running. And you'll be working with the same commands and user interface as Crosstalk Mark 4.

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April 1991 Crosstalk Communicator

April 1991 Crosstalk Mk.4

April 30, 1991 Crosstalk Mk.4 Version 2.0

★★★★ Vol. 7 No. 12 1990 Crosstalk Mk.4

How To Avoid A High-Speed Comm Crash.

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price per hour.

Finally, you may have to call long distance to reach a high-speed port. BIX's high-speed ports require a call to Massachusetts. CompuServe maintains V.32 modems only in major cities, and then CompuServe's own packet network creates a bottleneck. If you log into a service via a public packet network instead of dialing direct, your data compression will go to waste. With both Tymnet and GEISCO (for GEnie), 9600-baud dial-ins use the error-correcting MNP-4 protocol, but not the data compressing MNP-5 or V.42bis protocols.

Many bottlenecks and surcharges will disappear as higher speeds become the norm. As "Saving On-Line Dollars at High Speeds" shows, many users can still benefit from paying the 9600-baud surcharge, but others may find it more cost-effective to stick with the 2400-baud line.

On-Line Services Inch Toward Higher Speeds

These are the high-speed protocols supported by major on-line services at press time. MCI Mail plans to offer 9600-baud service at no surcharge by the end of 1992, and others, such as America Online, are expected to expand their offerings as well.

Service	MNP-4	MNP-5	V.42	V.42bis	V.32	V.32bis	9600-baud (V.32) hourly surcharge
AMERICA ONLINE	No	No	No	No	No	No	n/a
BIX	Yes	Yes	Yes	Yes	Yes	Yes	$4 off-peak, $8 peak
COMPUSERVE	Yes [1]	No	Yes [1]	No	Yes [1]	No	$10
GENIE	Yes	No	No	No	Yes	No	$12
MCI MAIL	Yes	Yes	No	No	No	No	n/a
PRODIGY	No	No	No	No	No	No	n/a
THE WELL	Yes	Yes	Yes	Yes	Yes	No	$4

[1] Only in major cities.

Saving On-Line Dollars at High Speeds

This table shows average times and costs of downloading a 30K Zip file from CompuServe at 2400 and then 9600 baud. If you make a local call to CompuServe directly at 9600 baud, you can save up to 50 percent on connect time charges—even when you factor in the surcharge. But if you have to make a long-distance call to reach that high-speed node, you could end up paying more at 9600 baud.

	Time [1]	Hourly rate	Total on-line charges [1]
2400 baud	144 seconds	$12.50	$0.50
9600 baud	61 seconds	$22.50	$0.38

[1] Average from three separate trials.

CHOOSING THE RIGHT MODEM

Assuming you've decided V.32bis is the way to go, how can you choose among all the models listed? Obviously, you want a fast modem—we didn't benchmark each of these models, but our exploratory tests showed relatively slight differences in speed.

We also found good compatibility between different brands of V.32bis modems. Occasionally, you'll find two modems that won't connect at a particular speed or that use a slower protocol than they should, but such problems are rare these days.

You'll need to decide between an external (RS-232) and an internal (ISA) model. Most vendors offer both, discounting the internals by $20 to $50. The externals offer status lights and easy portability (the typical external is lighter and smaller than the Smartmodems of old). The internal models avoid clutter, and some may be slightly faster than externals because they eliminate the modem's slow serial interface. Aside from fax capability, one feature to consider is callback security—if you're setting up your modem to answer calls, you may want one that requests a valid password or phone number from the caller and then dials the remote number back.

Some of these modems offer additional protocols to keep them backward compatible with the proprietary schemes used before V.32 and V.32bis. And one protocol looks to the future: Modems with a *V* in the table's "Other protocols" column implement preliminary versions of V.Fast. This proposed CCITT modulation scheme will be much faster than V.32bis, but it probably won't be finalized for another year or so. If you buy one of these modems, make sure the manufacturer agrees to provide an upgrade, if necessary, when the standard is set. And don't count on different brands of V.Fast modems being compatible with one another until that time.

Finally, your purchase decision comes down to bread-and-butter issues like price, warranty, and bundled software. Whatever your decision, one of the speed demons in this table should help keep your on-line and phone charges manageable while keeping your data communications sessions as short as possible.

Brett Glass is a contributing editor for PC World. *He can be reached on PC World Online. Ruth Anne Ladue provided research.*

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—Infoworld, Sept. 16, 1991

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High-Speed Modems

Manufacturer	Product	List price	Warranty (years)
ADTECH MICRO SYSTEMS	Hi-Per Fax 9696e	$398	5
	Hi-Per Fax 9696i	$298	5
ADVANCED MICROCOMPUTER SYSTEMS	Xpress 96S	$425	5
	Xpress 96ES	$499	5
	Xpress 96MC	$495	5
AMT INT'L INDUSTRIES	AMT Star 1442e	$499	5
	AMT Star 1442i	$479	5
ATI TECHNOLOGIES	2400 ETC Fax	$199	5
	2400 ETC E	$179	5
BAY CONNECTION	Spectra-Com 1414e	$549	5
	Spectra-Com 1414i	$499	5
BEST DATA PRODUCTS	Smart One 1442F	$549	2
	Smart One 1442FX	$599	2
BOCA RESEARCH	Bocamodem 14.4Kbps V.32bis Internal	$395	5
	Bocamodem 14.4Kbps V.32bis M1440e	$495	5
CALPAK	MXE-9696	$649	10
CARDINAL TECHNOLOGIES	MB14400SR	$799	1
COMPUCOM	SpeedModem Speedster (external)	$299	5
	SpeedModem Speedster Plus (internal)	$329	5
	SpeedModem Star Plus (external)	$629	5
COMPUTER PERIPHERALS	ViVa 14.4/Fax	$549	5
CXR TELECOM	9632-MM1	$895	1
DALLAS FAX	96/96bis V.32bis/V.42bis	$328	5
	96/96E	$369	5
DATA RACE	Data Race Action PC 1496	$795	2
DIGICOM SYSTEMS	9624LE+	$695	2
	ScoutPlus PC	$530	5
E-TECH RESEARCH	P9696MX	$745	2
FASTCOMM COMMUNICATIONS	FDX 9642T	$1199	2
FORVAL AMERICA	IM 14400	$945	5
	SA 14400	$995	5
GALAXY NETWORKS	Gemini V.32b Superquad	$995	2
	UFO V.32b/Turbo/V.42bis	$695	2
GENERAL DATACOMM	914 PC	$795	2
	914 S/A	$795	2
GVC TECHNOLOGIES	FM9696/144V	$589	5
HAYES MICROCOMPUTER PRODUCTS	Ultra 144	$1199	2
HT COMMUNICATIONS	Pro 2144	$795	2
IMAGE COMMUNICATIONS	Twincom 14.4DF external	$549	2
	Twincom 14.4DF internal	$449	2
	Twincom 96/42i	$299	2
INTEL	Intel 14.4EX (PCEM72144)	$699	3
LIGHTNING COMMUNICATIONS	LightCom 14.4F external	$399	1
	LightCom 14.4F internal	$342	1
LOGICODE TECHNOLOGY	Quicktel 14,400 V.32bis Modem (external-14.4XV)	$479	lifetime
	Quicktel 14,400 V.32bis Modem (internal-14.4HV)	$459	lifetime
	Quicktel V.32bis S&R Fax/Modem (external-1414XV)	$559	lifetime
MACRONIX	MaxLite 144/PC	$699	5
MICROCOM	MicroPorte 4232bis	$899	1
	QX/4232bis	$899	1
	QX/4232bis+	$1099	1
MICRO ELECTRONIC TECHNOLOGIES	9696PF-Pocket Fax/Modem	$399	5
MICROGATE	MG144i	$799	1
	MG96m	$699	1

[1] Extra-cost option.
C = CompuCom Speed Protocol.
E = Express 9600 (Hayes).
M = MNP-10 (for cellular phones and very noisy lines).
V = V.Fast (preliminary).
X = X.25.

Interface	Other protocols	Synchronous mode	Fax	Fax speed (baud)	Callback security	Bundled software	Reader service number
RS-232	none	N	Y	9600	N	PerfectFax, WindoFax (Magicsoft)	696
ISA	none	N	Y	9600	N	PerfectFax, WindoFax (Magicsoft)	696
RS-232	M, V	Y	Y	9600	Y	QuickLink	697
EISA	M, V	Y	Y	9600	Y	QuickLink	697
MCA	M, V	Y	Y	9600	Y	QuickLink	697
RS-232	none	Y	N	n/a	N	QuickLink II	698
ISA	none	Y	N	n/a	N	QuickLink II	698
ISA	none	N	Y	9600	N	ATI Fax etc, Hyperaccess/5a, Windows Fax	699
RS-232	none	Y	Y	9600	N	ATI Fax etc, Windows Fax	699
RS-232	none	Y	Y	14,400	N	Comit Fax and Communications	700
ISA	none	Y	Y	14,400	N	Comit Fax and Communications	700
ISA	M	Y	Y	14,400	N	QuickLink II Fax	701
RS-232	M	Y	Y	14,400	N	QuickLink II Fax	701
ISA	none	Y	Y	14,400	N	QuickLink II Fax	702
RS-232	none	Y	Y	14,400	N	QuickLink II Fax	702
RS-232	M, V	Y	Y	9600	N	ZCOM Zfax	703
RS-232	none	Y	Y	14,400	N	FlashLink for Windows, FlashLink Fax	704
RS-232	C	N	N	n/a	N	none	705
ISA	C	N	Y	9600	N	MTEZ	705
RS-232	C	Y	Y	9600	N	MTEZ	705
RS-232	none	Y	Y	14,400	N	QuickLink II Fax, Winfax	706
RS-232	none	Y	N	n/a	N	none	707
ISA	none	Y	Y	9600	N	MTEZ, QuickLink II Fax, Winfax	708
RS-232	none	Y	Y	9600	N	MTEZ, QuickLink II Fax, Winfax	708
ISA	none	N	Y	9600	N	Action Fax, RaceCom	709
RS-232	none	Y	Y	9600	Y	QMODEM, Bitfax	710
ISA	none	N	Y	9600	N	QMODEM, Fax	710
RS-232	none	N	Y	9600	Y	QuickLink Fax	711
RS-232	none	Y	N	n/a	Y[1]	none	712
ISA	none	N	N	n/a	N	Communications by Crosstalk	713
RS-232	none	Y	N	n/a	N	Communications by Crosstalk	713
RS-232	none	Y	N	n/a	N	none	714
RS-232	none	Y	N	n/a	N	none	714
EISA	none	N	N	n/a	N	Cross+Diol	715
RS-232	none	Y	N	n/a	Y	Cross+Dial	715
RS-232	none	Y	Y	9600	Y	QuickLink II	716
RS-232	E, X	Y	N	n/o	N	Smartcom EZ	717
RS-232	none	Y	Y	9600	N	none	718
RS-232	none	N	Y	14,400	N	QuickLink II	719
ISA	none	N	Y	14,400	N	QuickLink II	719
ISA	none	N	N	n/a	N	none	719
RS-232	none	Y	N	n/a	N	Crosstolk Communicotor	720
RS-232	none	Y	N	n/a	N	none	721
ISA	none	N	Y	14,400	N	QuickLink II Fox	721
RS-232	none	Y	N	n/a	N	QuickLink II or Bitcom	722
ISA	none	Y	N	n/a	N	QuickLink II or Bitcom	722
RS-232	none	Y	Y	14,400	N	QuickLink II or Bitcom ond Bitfox	722
RS-232	M	N	Y	14,400	N	MaxTolk, Winfax, Comit	723
RS-232	M	N	N	n/a	N	none	724
RS-232	M	Y	N	n/a	N	Corbon Copy Plus 6.0	724
RS-232	M	Y	N	n/a	Y	none	724
RS-232	none	N	Y	9600	N	QuickLink II	725
ISA	none	N	Y	14,400[1]	Y	QuickLink II	726
MCA	none	N	Y	9600[1]	Y	QuickLink II	726

Table continues on following pages

High-Speed Modems *continued*

Manufacturer	Product	List price	Warranty (years)
MICRO INTEGRATED COMMUNICATIONS	MICC 14400/PC	$795	2
	MICC 14410/SA	$995	2
MITSUBA	SM9600	$420	15 months
MOTOROLA CODEX	3260 V.32bis	$1195	2
MULTI-TECH SYSTEMS	MultiModem II MT1432BA	$849	2
NEC AMERICA	N9635E	$1199	1
NUVO CORPORATION OF AMERICA	Nuvotel 14400I	$749	lifetime
	Nuvotel 14400IFX	$849	lifetime
OCTOCOM SYSTEMS	OSI 8196	$795	1
	OSI 8396	$1195	1
PRACTICAL PERIPHERALS	PM14400FX	$499	lifetime
	PM14400FXSA	$549	lifetime
SUPRA	SupraFaxModem V.32bis for DOS (external)	$439.95	5
	SupraFaxModem V.32bis for Windows (external)	$439.95	5
TELEBIT	T3000	$949	2
TELEGLOBE COMMUNICATIONS	DA 3214C	$945	1
TELENETICS	Blue Streak TC 1442bis	$725	2
UDS MOTOROLA	V.3229 DataModem	$1145	2
	V.3229L DataModem	$995	2
U.S. ROBOTICS	Courier V.32bis	$995	2
	Sportster 14,400/PC	$549	5
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RS-232	none	Y	N	n/a	N	none	740
ISA	none	N	N	n/a	N	Crosstalk Communicator	740
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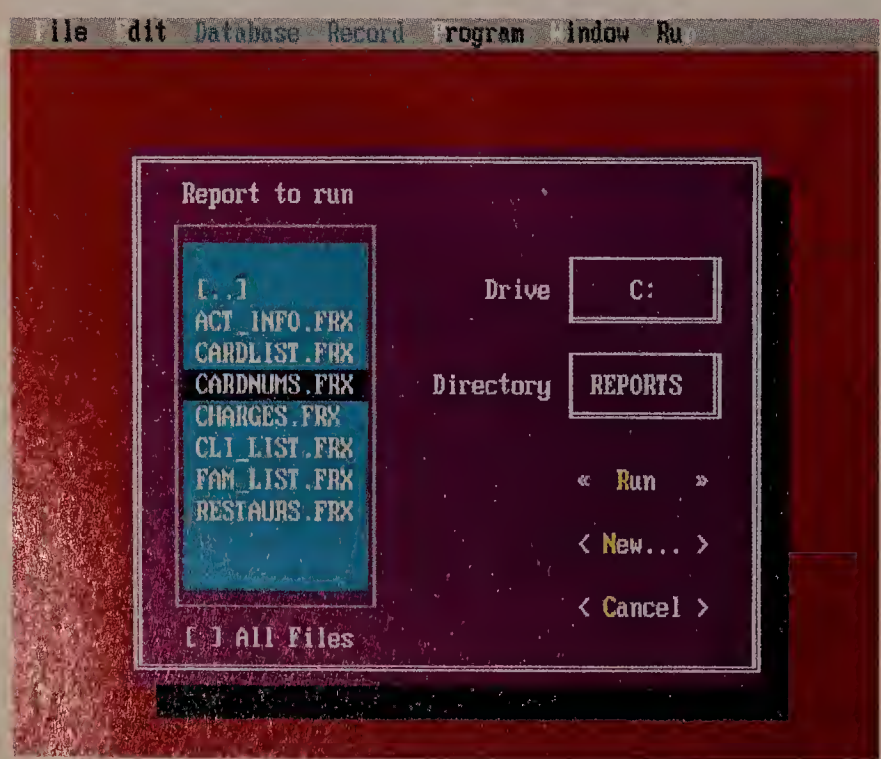

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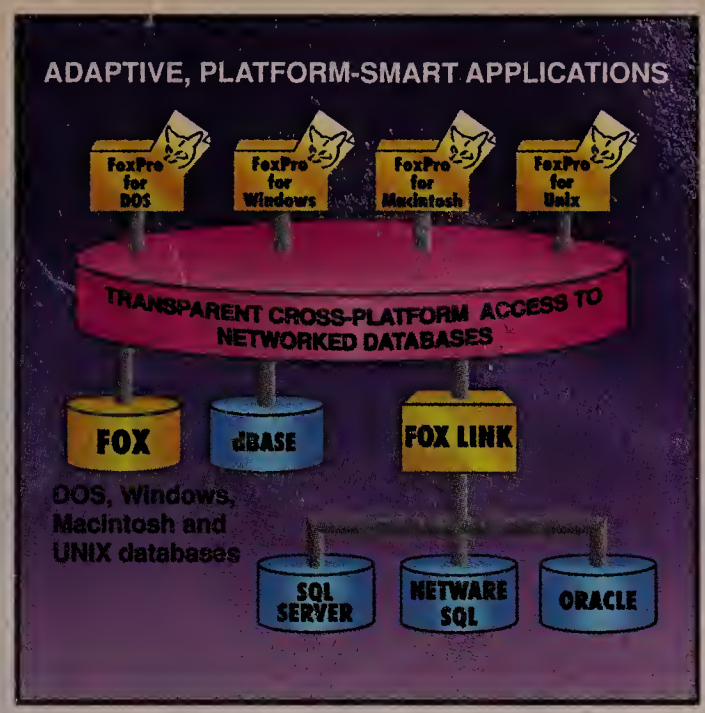

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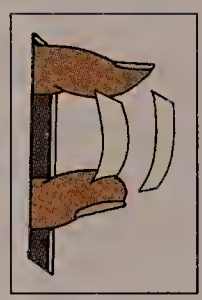


If you want to see the future of software, look no further than the latest Windows spreadsheets from Lotus, Borland, and Microsoft.

BY JOHN WALKENBACH

IF YOU WANT TO GLIMPSE the interface of the future, you won't have to look far. A raft of new spreadsheets will be released over the next few months—all running under *Windows*—ushering in some of the most significant advancements in user interfaces in years. And with these technological breakthroughs comes an unparalleled ease of use sure to be copied across all types of applications.

Microsoft has just introduced a major upgrade of *Excel*, and Lotus and Borland are not far behind, with plans to introduce competing packages in the next few months. After the lukewarm response to its initial release of *1-2-3 for Windows*, Lotus has revamped the package and is scheduled to introduce release 2.0 this summer. Hot on its heels is *Improv for Windows*, scheduled for a fall release. *Improv* is an enhanced version of the unique Lotus financial analysis package that debuted on the NeXT machine in 1990. Borland, for its part, will take the wraps off the eagerly awaited *Quattro Pro for Windows* this month.

Although approaches vary among packages, all next-generation spreadsheets share one important benefit: Their state-of-the-art interfaces eliminate many complexities, thereby enabling you to spend your time thinking about your data rather than figuring out how to operate your spreadsheet.

Keeping It Simple

In each of the new packages, you'll find an improved user interface, more straightforward and intuitive operation, and an emphasis on consistency and seamless compatibility with foreign file formats. In deference to individual preferences, each package typically offers a variety of ways to achieve the same effect. In many cases, you can use the menu system, click an icon, right-click to display a context-sensitive menu, or use a keyboard shortcut to accomplish a specific task.

Many of the breakthroughs involve direct manipulation. Let's say, for example, you want to move a range of cells down a few rows in your worksheet. Normally this involves a couple trips to the menu to access the Edit Cut and Edit Paste commands. *1-2-3 for Windows*, *Quattro Pro for Windows*, and *Excel* let you simply select the range and drag it to the new spot using the mouse—just as you would with a graphic object. Want to copy the range? Hold down the <Ctrl> key while you drag. These same procedures work for entire rows and columns.

Most users spend a great deal of time creating formulas and copying them to adjacent cells. *Excel* has fully automated this process with a concept called autofill. When you select a cell or range in *Excel*, a small handle appears at the lower right corner of the selection. Dragging

SHEETS

Generation

the handle copies the selection either horizontally or vertically. If the selection is a recognized label (such as January, Q-1, or Monday), *Excel* will automatically complete the series for you. And it gets even better: If the selection is a series of values, the auto-fill feature will calculate a quick linear regression and then project subsequent values.

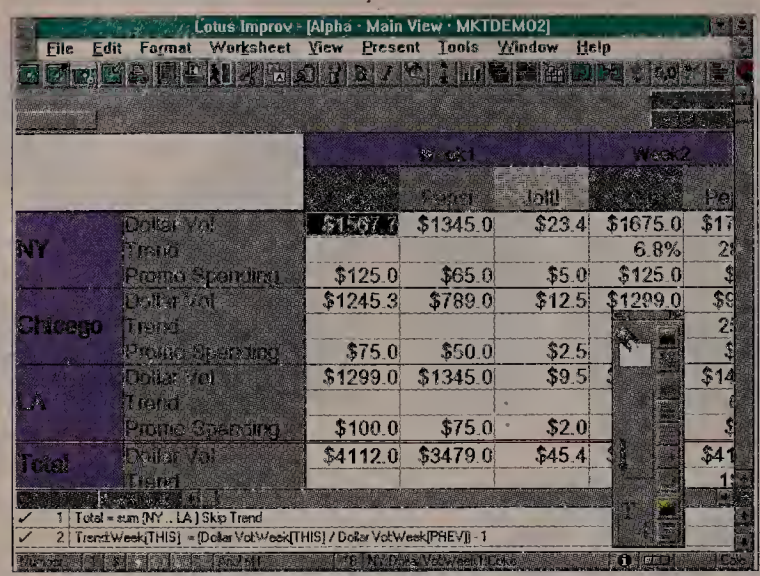
Like *Excel*, *Improv* automatically fills in labels. But it takes a radical approach to the formula-copying problem by doing away with it altogether. Instead, you can input a single formula using English language category names—for example, Net Income=Income-Expenses. A formula like this is a snap to change.

Shortcuts and More

All the new spreadsheets make use of icons to provide shortcuts for common operations: Most include icons for formatting, graphing, drawing, and other frequently performed functions. *Excel* does this exquisitely. For example, a simple mouse-click can automatically select the current block of data, increase or decrease the number of decimal places displayed, or cycle through all foreground or background color choices. Better yet, many of the icons serve double duty. Hold down the <Shift> key while you click the column-widen icon, for example, and the column will get narrower.

Lotus originated the concept of user-programmable icons (known as SmartIcons in *1-2-3*), and a similar feature is

ILLUSTRATION BY ISTVAN BANYAI



Changing the view of multidimensional data in Lotus's upcoming Improv for Windows is as easy as dragging category labels to different spots in the worksheet.

now found in both *Excel 4.0* and *Quattro Pro for Windows*. *Excel* lets you display multiple sets of icons for specific tasks such as drawing, charting, or formatting. You can customize these icon sets any way you like, crafting the interface to suit your needs. *1-2-3 for Windows* allows customization but tries to simplify the task with context-sensitive icons and menus. If you're in the charting mode, for example, the icons change to include drawing tools.

Icons aren't the only way to get something done quickly, though. *Excel 4.0* and *Quattro Pro for Windows* now take advantage of the right mouse button to provide easy access to frequently used operations. In *Excel*, right-clicking on a selection (a range or a graphic object) displays a context-sensitive menu that quickly leads to a dialog box. For example, if you select a range and right-click, you can jump directly to any of several formatting dialog boxes or perform operations such as cut, copy, and insert. In *Quattro Pro for Windows*, the right mouse button isn't as general, but it's useful nevertheless. Right-clicking in *Quattro Pro for Windows* pops up an interactive dialog box that lets you manipulate the properties of your selection. For copy and cut operations, you need to use the menus, hot keys, or icons.

Lotus hasn't breathed life into the right mouse button yet, but it provides several alternatives that are almost as convenient. *1-2-3* now makes good use of the status bar at the bottom of the screen—real estate that formerly had read-only status. Like Lotus's *Ami Pro*, the *1-2-3 for Windows* status bar now displays information such as font, size, and style *and* lets you change it via the bar. For example, you can access the font list by clicking on the FONT indicator. Likewise, the worksheet will recalculate when you click on the CALC indicator.

I Wanna Hold Your Hand

New users have been known to fritter away hours figuring out a new procedure. To ease this problem, *Excel 4.0* now includes Wizards that help you create a chart and develop a data cross-tabulation. These Wizards are a series of highly interactive dialog boxes with VCR-like controls that guide you, step-by-step, through each process. By the time you get to the end, you're virtually guaranteed the correct graph or cross-tab table.

1-2-3 for Windows incorporates a similar concept for accessing data bases. *1-2-3*'s new query box provides a visual representation of your query, which you can build and modify interactively.

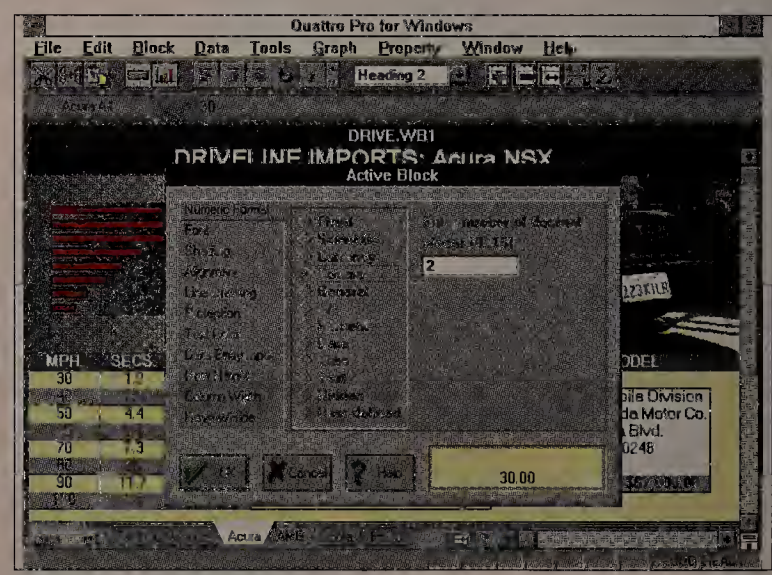
3-D and Beyond

Let's face it. Keeping track of multiple worksheets has always been a nightmare. Even the 3-D approach popularized by Lotus was awkward and unintuitive. But with *Quattro Pro for Windows*, Borland has finally done it right. Rather than simply giving you the ability to insert additional pages, Borland makes them accessible by displaying notebooklike tabs at the bottom of the screen. Click a tab, and you jump to the corresponding page. This notebook metaphor works well and actually *encourages* the use of additional worksheet pages because you can assign them meaningful names, which appear on the tabs. The only drawback is, you can view only one page at a time—unless you open another view of the same notebook.

Excel, though limited to traditional 2-D worksheets, has extended its work space concept to workbooks. A workbook is a collection of worksheets, macro sheets, and charts that can be stored in a single file. You can open a workbook with one command, and a table of contents window lets you quickly jump to the window you need. This solves the problem of keeping track of multiple open worksheets.

It's not uncommon, for example, to have a dozen or more files open at one time, including worksheets, charts, and macros. Moving to the desired document can be very time-consuming because you can't display many at once. Now, you can click on an icon to display the table of contents and then click on the sheet you want.

Improv works with up to 12 dimen-



Click on the right mouse button in Quattro Pro for Windows to access menus that list all your options for modifying the highlighted object.

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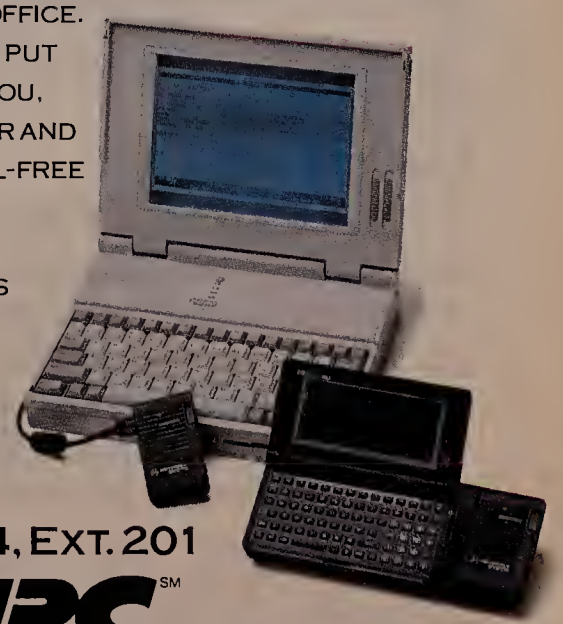

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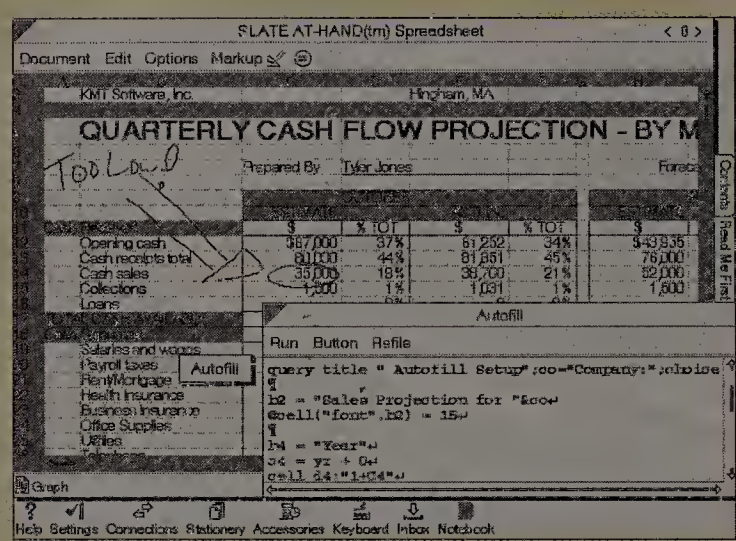
Take-It-With-You Spreadsheets

by Russell Glitman

If you've ever been in a business meeting and whipped out your calculator and a scrap of paper to jot down some figures, *At-Hand,* developed by Slate Corporation, is a spreadsheet designed for you.

This pen-based electronic spreadsheet—not the first in this emerging field but the most impressive—was developed by Dan Bricklin, cocreator of *VisiCalc,* the first commercially available spreadsheet. It runs under Go Corporation's PenPoint operating system for pen-based computers. But don't let that frighten you; it follows standard spreadsheet conventions. And *At-Hand* needs just 500K RAM, uses 1.5MB of disk space, and is compatible with *1-2-3* and *Excel* file formats.



Want to comment on data in a worksheet? That's no problem with At-Hand. A mark-up layer lets you annotate a document using the pen.

At-Hand is a pencentric application, meaning it doesn't require a keyboard or a mouse. You use an electronic pen to write directly on a worksheet; cut, copy, and paste; change fonts; and select from 15 chart styles, including 3-D graphs. A mark-up layer acts like a sheet of acetate so you can annotate your document. And since even the best handwriting recognition leaves something to be desired, *At-Hand* has a deferred recognition function that saves handwritten entries as a bit map. You can convert selected entries to text at your convenience.

At-Hand, which can create 256-by-8192-cell worksheets, costs $295. Slate, 15035 N. 73rd. St., Scottsdale, AZ 85260; 602/443-7322, 602/443-7325 (fax).

Reader service no. 832

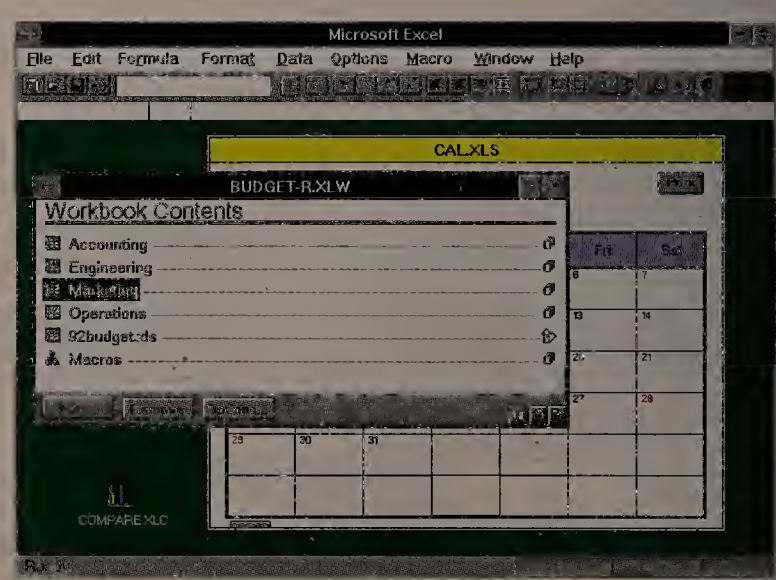
sions and stores as many as 100 worksheets in a file, providing an easy way to keep relevant information together and readily accessible. Given this design, *Improv* virtually guarantees that your data will be organized and the formulas error free.

A New View of Data

In the past, the structure of a spreadsheet was considered relatively static. Making a major change, such as changing categories for subtotals, required manual effort. And one of the most common spreadsheet activities, what-if analysis, was officially recognized only through esoteric constructs such as data tables. The outliner in *Excel 3.0* was a positive step, offering a whole new way to expand and contract data, but it didn't go far enough.

Excel 4.0 takes the leap. You can now assign names to views, which include window size and placement, frozen panes, printer settings, display options, and the position of the active selection. You can then pick a specific view from a list to transform your screen instantly.

But *Improv* is the hands-down choice for view management. It's ideal for multidimensional data with items arranged in categories. Let's say, for example, your budget includes a Line Item category, a Month category, and a Budget vs. Actual category. You can view this information from any perspective and arrange items in subgroups by dragging dimension labels to different places on the worksheet. The concept is hard to describe but easy to work with. Financial analysis will never be the same.



Excel 4.0's workbooks feature lets you group a set of related worksheets in a single file. A table of contents window allows access to all the worksheets in a set.

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Circle 207 on reader service card

Scenario Management: What-If Made Easy

A common pastime among spreadsheet users is setting up a worksheet model and systematically changing one or more input cells to observe the effects of different scenarios on the dependent formulas. In the past, this required a manual effort—unless you took the time to develop a macro. *Excel 4.0* and *1-2-3 for Windows* bring what-if analysis to new levels. *Excel* provides a Scenario Manager add-in that lets you assign names to specific sets of assumptions. Select a name from the list, and it makes the appropriate substitutions and displays your worksheet.

Although *Excel*'s Scenario Manager will be fine for most users, hard-core what-iffers will be delighted with *1-2-3 for Windows'* comprehensive scenario manager features, which are designed for single users as well as work groups. You can easily display different scenarios, and *1-2-3 for Windows* stores information such as who created each scenario and when. For work-group situations, you can consolidate scenarios from colleagues and display them almost any way you want.

Most users only scratch the surface when it comes to using a spreadsheet's analytical capabilities, but advanced users or those in scientific disciplines welcome every new twist they can get their hands on. For this group, *Excel* offers a new add-in called Analysis Pro-Pak, which includes 19 statistical procedures and almost 100 new functions primarily for engineers and financial analysts.

Customizing Your Worksheet

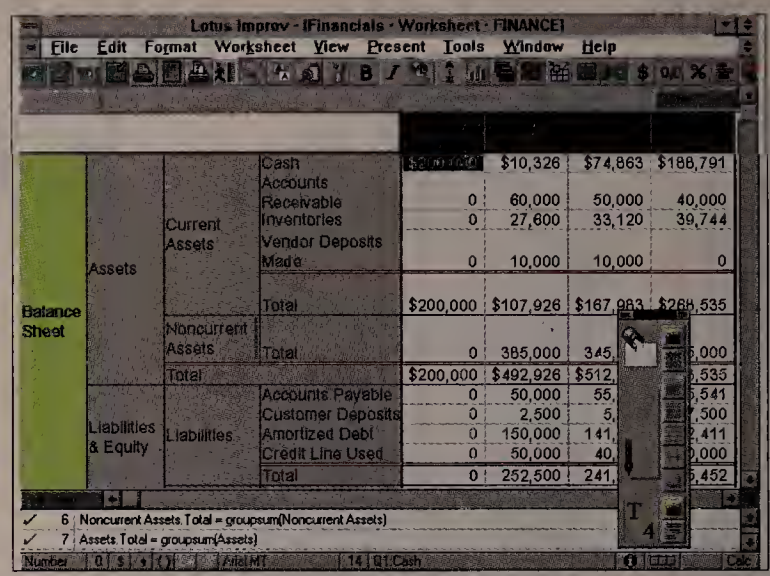
One of the most appealing elements of the original *1-2-3* was its macro language. Users could approach the spreadsheet as a programming language and develop interactive "applications" for others. But most people are not programmers, so complex macro development has been limited to advanced users with the time and skill to do it right.

Quattro Pro for Windows puts application development power in the hands of all users. Designing an interactive dialog box linked to a worksheet, for instance, is a push-button proposition. And it can all be done without a single macro. Borland is the clear leader in this category.

Presenting Your Data

Manipulating data is one thing, but whipping it into shape so you can share it with others is another. *Excel 4.0*, *1-2-3 for Windows*, and *Quattro Pro for Windows* now incorporate named styles—nearly identical to the feature found in most word processors. *Excel* takes this to the next logical level with its new Autoformat. Select a cell in a table and click the Autoformat icon. *Excel* determines the table boundaries and produces a nicely formatted table with complementary colors, fonts, and borders. If you don't like what you see, keep clicking the icon to cycle through 14 predefined table formats. Unfortunately, though, you can't define your own table formats.

Adding simple drawings or diagrams to a worksheet can make data come alive. *Excel 3.0* was the first spreadsheet to make this possible by providing a set of drawing tools to use directly on the worksheet. This feature is now incorporated into *1-2-3 for Windows*. You can also add graphic objects to worksheets in *Quattro Pro for Windows*, but you have to create a separate graph window to do so—a seemingly unnecessary step in an otherwise object-oriented product.



View management is a breeze in Improv for Windows—it's perfectly suited for showing multidimensional data.

Quattro Pro for Windows provides a rich set of tools that let you create custom dialog boxes, which can be incorporated into a macro-driven spreadsheet application.

Ready to Upgrade?

These four ground-breaking packages are the state of the art in spreadsheets. Designed with the user in mind, they take the genre to new heights in both raw functionality and ease of use. If you've been considering trading in your clunky text-based spreadsheet, there's never been a better time.

Contributing Editor John Walkenbach is coauthor of the PC World 1-2-3 for Windows Complete Handbook *(IDG Books, San Mateo, California, 1991) and coauthor of the* PC World Excel for Windows Complete Handbook *(IDG Books, 1992). Russell Glitman is the executive editor for* PC World.

The World Standard

st Edition ★★★★★ Everything you've been missing

HIDDEN PLOTS DISCOVERED

esktop Mapping eld Responsible

r years organizations have had to ly on spreadsheets and other data alysis techniques to interpret formation. But apparently, they've en missing a lot. The new technology desktop mapping is revealing just w much.

As spokesmen at MapInfo,® e leader in desktop mapng, put it: "By advancing lational database technology to incorporate data ith maps, MapInfo has oduced a breakthrough in alysis capabilities. It is erally 'showing' its users tterns, relationships and ends that they never knew isted.

"In the process, it's lowing them to understand nd present information ore quickly, clearly and oroughly. It's helping em deploy their resources ore realistically and rofitably. It's showing them how to target customers, service territories and optimize sales. It's helping them plan land use, select site locations, and efficiently manage facilities and operations.

"In a word, it's allowing them to visualize and take advantage of options and opportunities that other data analysis techniques simply can't show."

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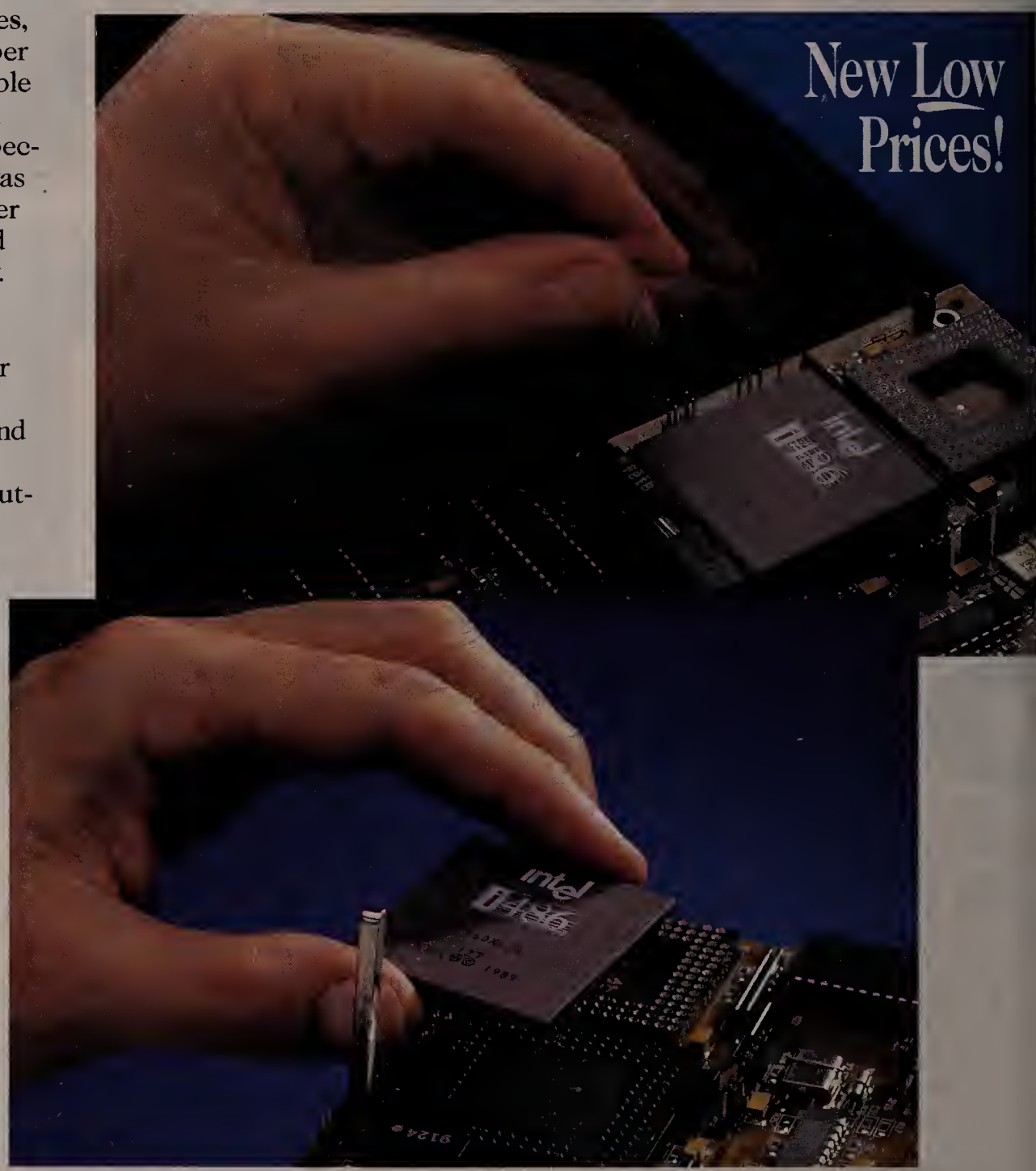

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upgradability with lift-a-lever ease!

Tower case for maximum expansion and for use as a file server! Everything about this case says "power." You get a 220 watt switching power supply and eight expansion slots – easily handles three exposed and four internal 5.25″ half-height devices, too.

intel inside

To get all the advantages of ZXP technology and conserve space, Northgate's space saving desktop case is your solution. But don't be misled by its compact size. This system delivers pure power and has seven expansion slots. Features a whisper-quiet 200 watt power supply and room for three exposed 5.25″ half-height and two exposed 3.5″ devices – expansion is a breeze!

Step up to even greater expansion capability! Northgate's full-size desktop case is your best choice when space is no object. A 200 watt power supply provides plenty of power for your toughest applications. Expansion capacities include eight expansion slots plus space for three exposed and two internal 5.25″ half-height devices.

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DOT Matrix PRINTERS

True or false? Laser printer prices are so low that dot matrix printers will soon go the way of 360K floppies and CGA displays.

False. Although lasers are gaining ground, dot matrix printers outsold them almost two to one last year, and strong sales are forecast for many years to come.

The big reason is that 24-pin dot matrix printers are cheaper to buy and use than ink jets and lasers (see the sidebar "Dot Matrix Printing: Lower Costs by the Page"). This factor makes them ideal personal printers, particularly if you're sharing an overworked laser with your colleagues at the office.

The other reason is that they're smarter than you might think. Because of new noise-reducing technologies, for example, today's dot matrixes are quieter than their forebears. Many models are now as quiet as the average laser.

Dot matrix printers can also handle paper formats that stump most lasers, such as continuous form and 11 by 17 ledger, and they can print through multipart carbon copy forms, which no laser can do.

These same printers, if you shift into letter quality mode and maybe add a film ribbon, can turn around and churn out high-quality business letters. Thanks to advances in printer control languages, a few dot matrixes offer scalable fonts, which will make your output even snappier.

Scalable fonts or no, you still aren't going to use one of these machines for desktop publishing. And though their graphics output is good enough for rough drafts, it isn't acceptable for final versions you send to important clients. For those special jobs, you still need an ink jet or a laser.

But for other everyday print jobs, an inexpensive 24-pin dot matrix will do the trick. We've found a sampling of 40 24-pin printers with list prices from $299 to $999. Thanks to price pressure from low-end lasers, discounts on dot matrixes can be as deep as 50 percent.

NO, THEY'RE NOT DEAD YET! LOW PRICES, VERSATILE PAPER HANDLING, AND LASERLIKE TRICKS CHARACTERIZE THE LATEST CROP.

BY SCOTT SPANBAUER

The Wide and Narrow of It

When choosing a 24-pin printer, your first question should be, wide carriage or no? A wide carriage is a must for anyone who regularly prints 11 by 17 spreadsheets or other large documents. If you print wide sheets only occasionally, you can save money by using a narrow-carriage printer in landscape mode.

Since the unit may end up on your desk, size is important. Many new dot matrixes take up no more room than a big dictionary; Epson's ActionPrinter 3250 can even hang off the edge of your desk for a zero-square-inch footprint.

You should also consider noise. Some vendors have added foam padding and better pin control to reduce dot matrix whine. As a result, many of these printers now have noise ratings between 50 and 55 decibels (db), compared with the 45db to 53db produced by lasers. Quiet modes reduce the noise by another 2db or 3db but slow printing considerably.

High-Speed Impact

With letter quality print speeds hitting from 150 to 180 characters per second (cps), some dot matrix printers are nearly as fast as 4-page-per-minute (ppm) laser printers.. The speeds listed in our table are vendor estimates only; actual print speeds can be considerably slower.

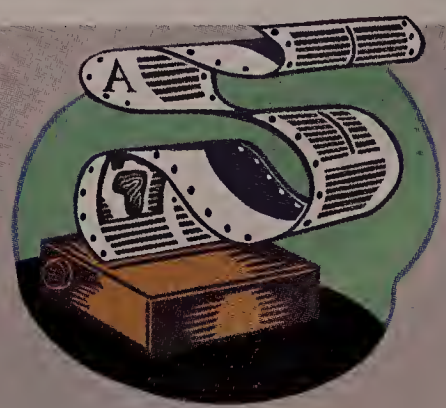
ILLUSTRATIONS BY SCOTT BALDWIN

An adequate print buffer can keep you moving on long or complex print jobs. As a general rule, 3K will hold one page of text using a font resident in the printer. The bigger the buffer, the sooner you'll regain control of your computer.

Beyond Bit Maps

Unless you plan to print exclusively in draft mode, look for a printer with a good collection of fonts. Most of these printers come with six or seven resident bit-mapped typefaces in a couple of sizes—enough for everyday letters and memos.

If you want fancier type, these machines give you a couple of options. You could use font-scaling software, but downloading soft fonts to dot matrix buffers can be tortur-



Dot Matrix Printers

		LIST PRICE		STANDARD FEATURES						
Manufacturer	Model	Narrow carriage	Wide carriage	Dimensions (inches)	Weight (lbs.)	Noise rating (db)[1]	Quiet mode	Rated speed (LQ/draft, in cps)	Buffer size (standard/ maximum, in K)	Landscape mode
ADVANCED MATRIX TECHNOLOGY	Accel-242	$499		5.6 x 16.6 x 13	19.5	54	N	66/240	8/32	Y
	Accel-244		$585	5.6 x 21.5 x 13	22.5	54	N	66/240	8/32	Y
ALPS AMERICA	Allegro 500	$499		6.7 x 18 x 11.8	12.8	55	N	180/250	23/55	Y
	ALQ224gx	$799		5.6 x 18.5 x 15.8	30.9	56	N	93/280	23/279	Y
BROTHER	M-1324L	$399		5.5 x 17.8 x 12.7	11	55	Y	72/216	8/32	Y
	M-1924L		$949	6.1 x 24.5 x 15.3	26.5	55	Y	112/270	64/96	Y
BULL HN	PRT4242		$995	5.7 x 24.4 x 13.8	23	53	N	67/260	44/44	Y
CITIZEN AMERICA	GSX-130	$399		5.1 x 16.9 x 12.6	11	55	Y	60/180	8/40	N
	GSX-145		$599	5.1 x 22.7 x 13.3	17	51	Y	64/192	8/40	N
C-TECH	ProWriter C-610+	$799		8.3 x 18.3 x 13.8	26.5	58	Y	80/240	26/32	N
DCS/FORTIS	DQ4210	$589		5.1 x 17.7 x 13.8	19	57	Y	80/240	24/56	Y
	DQ4215		$899	6.5 x 25 x 16	27	57	Y	80/240	24/56	Y
DIGITAL EQUIPMENT	LA75 Plus	$599		5.3 x 16.8 x 14.5	23	53	Y	83/250	8/32	N
EPSON	ActionPrinter 3250	$299		5.1 x 14.8 x 9.8	12	50	N	90/250	11/11	N
	LQ-870	$749		6.8 x 18 x 14.6	19.6	55	N	138/413	8/32	N
FUJITSU	DL1200		$649	7.7 x 20.7 x 9.8	15.4	52	N	90/300	2/24	N
	DL3600		$799	4.7 x 22.8 x 13.6	26.5	54	N	108/360	2/24	N
GENICOM	Geniprint Model GP20	$689		5.1 x 18.1 x 13.8	18	55	N	80/240	18/18	Y
	Geniprint Model GP25		$799	5.1 x 25.2 x 13.8	18	55	N	80/240	12/12	Y
LEXMARK INT'L	IBM Personal Printer Series II 2390	$499		7.5 x 19.6 x 11.3	14.8	55	N	60/200	32/64[5]	N
	IBM Personal Printer Series II 2391		$699	7.5 x 25.2 x 11.3	18.7	55	N	60/200	32/64[5]	N
MANNESMANN TALLY	MT130/24	$899		6.3 x 17.9 x 12.6	20.9	52	Y	150/300	17/49	N
	MT131/24		$999	6.3 x 23.5 x 12.6	25.7	52	Y	150/300	17/49	N
NEC TECHNOLOGIES	P3300		$399	6.3 x 22.9 x 13.5	38	54	N	150/216	8/8	Y
	P6200	$499		8.25 x 17.4 x 14.2	32	54	N	150/300	80/80	Y
OKIDATA	ML380	$349		4.7 x 15.7 x 13.6	16	57	N	63/192	8/8	Y
	ML391 Plus		$949	4.6 x 21.7 x 13.6	22.3	55	Y	90/270	23/40	Y
OLIVETTI	DM 124	$499		4 x 15.4 x 12	12.1	52	N	50/150	40/40	Y
PANASONIC	KX-P1124i	$499.95		5.6 x 16.9 x 14.1	18.7	55	Y	80/240	12/32	Y
	KX-P2624		$649.95	6.8 x 23.2 x 15.7	33.7	46.5	Y	100/300	26/58	Y
PRINTRONIX	P1013	$895		4.5 x 16.2 x 11.8	22.3	57	N	63/178[7]	2/2	Y
SEIKOSHA	LT-20	$499		2 x 14.5 x 11.3	6	55	Y	60/180	1/11	N
	SL-270		$999	5 x 23.9 x 13.8	26.5	55	Y	109/329	10/64	N
SHINWA OF AMERICA	SQ-2410	$499		6 x 16 x 12	12.8	55	Y	64/192	12/12	Y
STAR MICRONICS	NX-2415 Multi-Font		$599	5 x 23.2 x 13.1	22	58	Y	66/200	11/171	N
	NX-2430 Multi-Font	$399		5.9 x 17.3 x 13	14.1	52.8	Y	80/24	16/48	Y
TANDY/RADIO SHACK	DMP 202	$399		5 x 15 x 11	7.7	59	N	33/120	12/12	N
	DMP 2104		$599	4.6 x 21.9 x 12	22	59	N	80/240	32/32	Y
UNISYS	AP1337	$699		4.6 x 15.7 x 13.6	18.5	55	N	90/270	8/40	N
	AP1339		$949	4.6 x 21.7 x 13.6	22.3	55	N	90/270	8/40	N

[1] In regular mode.
[2] Hours at 10 percent usage.
[3] Extra-cost option.
[4] Font scaling available with Windows driver.
[5] Extra 32K available for downloading fonts only.
[6] Bundled with Adobe Type Manager type-scaling software.

ously slow. Some machines accept font cartridges, which are faster and easier to use than soft fonts; most vendors offer one to eight font cartridges containing several typefaces each. Finally, a few of the newer machines offer resident scalable fonts; generally, they give you a choice of only two typefaces, scalable between 8 and 32 points.

Hands-On Control

Thanks to today's applications, font, spacing, and margin controls on the front panel are now largely superfluous. However, they can still be helpful with some print jobs, particularly unformatted text files. Linefeed and formfeed controls are genuinely handy if you're going to be printing forms, envelopes, or labels.

FONT OPTIONS			FRONT-PANEL CONTROLS				PAPER HANDLING						SERVICE AND SUPPORT		
											PAPER PATH				
Bit-mapped type-faces	Scalable fonts	Cartridge slots/ cartridges available	Pitch/ font	Line spacing	Margins	Micro line/ form-feed	Sheet feeder/ manual feed	Form parking	Envelopes/ labels	Maxi-mum form parts	Front L/ rear U	Bottom/ top feed	Warranty (years)	Mean time between failures [2]	Reader service number
9	2	1/2	Y/Y	Y	Y	Y/Y	Y [3]/Y	Y	Y/Y	4	N/Y	Y/Y	1	16,000	606
9	2	1/2	Y/Y	Y	Y	Y/Y	Y [3]/Y	Y	Y/Y	4	N/Y	Y/Y	1	16,000	606
7	0	0	Y/Y	N	N	Y/Y	Y/Y	Y	Y/Y	4	N/N	N/Y	1	12,500	607
7	0	0	Y/Y	Y	N	N/Y	Y/Y	Y	Y/Y	5	N/Y	N/Y	1	15,000	607
7	0	1/1	Y/Y	Y	N	N/Y	Y [3]/Y	Y	Y/Y	3	N/Y	N/Y	1	6000	608
5	0	1/1	Y/Y	Y	N	N/Y	Y [3]/Y	Y	Y/Y	3	N/Y	N/Y	1	6000	608
4	0	1/10	Y/Y	Y	Y	Y/Y	Y/Y	Y	Y/Y	3	N/N	N/Y	1	9000	609
5	0	0	Y/Y	N	N	Y/Y	Y/Y	Y	Y/Y	4	N/Y	Y/Y	2	10,000	610
6	0	0	Y/Y	Y	Y	Y/Y	Y/Y	Y	Y/Y	4	N/Y	Y/Y	2	10,000	610
1	0	1/14	Y/Y	Y	Y	Y/Y	Y [3]/Y	Y	Y/Y	5	Y/Y	N/Y	2	5800	611
5	0	1/1	Y/Y	Y	Y	Y/Y	Y [3]/Y	Y	Y/Y	3	N/Y	N/Y	1	12,000	612
5	0	1/1	Y/Y	Y	Y	Y/Y	Y [3]/Y	Y	Y/Y	3	Y/Y	Y/Y	1	12,000	612
5	0	1/5	N/Y	Y	N	Y/Y	Y/Y	Y	Y/Y	4	N/Y	Y/Y	1	7500	613
5	2	0	N/Y	N	N	N/Y	N/Y	Y	Y/Y	2	Y/N	Y/N	2	4000	614
10	2	1/1	Y/Y	Y	N	Y/Y	Y/Y	Y	Y/Y	4	Y/Y	Y/Y	2	10,000	614
8	0	1/7	Y/Y	Y	Y	N/Y	Y/Y	Y	Y/Y	4	N/Y	N/Y	2	15,000	615
8	0 [4]	1/7	Y/Y	Y	Y	N/Y	Y/Y	Y	Y/Y	4	N/Y	N/Y	2	20,000	615
5	0	0	Y/Y	Y	Y	N/N	N/Y	Y	Y/Y	3	N/Y	N/Y	1	12,000	617
5	0	0	Y/Y	Y	Y	N/N	N/Y	Y	Y/Y	3	N/Y	N/Y	1	12,000	617
8	0	0	Y/Y	N	N	Y/Y	Y/Y	Y	Y/Y	4	Y/Y	Y/N	2	7000	618
8	0	0	Y/Y	N	N	Y/Y	Y/Y	Y	Y/Y	4	Y/Y	Y/N	2	7000	618
8	0	1/4	Y/Y	Y	N	Y/Y	Y [3]/Y	Y	Y/Y	6	Y [3]/Y	Y [3]/N	1	10,000	619
8	0	1/4	Y/Y	Y	N	Y/Y	Y [3]/Y	Y	Y/Y	6	Y [3]/Y	Y [3]/N	1	10,000	619
7	0	0	Y/Y	Y	N	Y/Y	Y/Y	Y	Y/Y	3	N/Y	N/Y	1	10,000	620
8	0	1/8	Y/Y	Y	N	Y/Y	Y/Y	Y	Y/Y	4	N/Y	Y [3]/Y	1	10,000	620
6	0	0	Y/Y	Y	N	Y/Y	Y/Y	Y	Y/Y	3	Y/Y	Y/Y	1	10,000	621
6	0	1/1	Y/Y	N	N	Y/Y	Y/Y	Y	Y/Y	4	Y/Y	Y/Y	1	12,500	621
5	0	0	N/N	Y	N	N/Y	Y/Y	Y	Y/Y	3	N/Y	N/Y	1	5000	622
11	0	0	Y/Y	Y	Y	Y/Y	Y [3]/Y	Y	Y/Y	4	Y/Y	Y/Y	2	15,000	623
11	0 [6]	0	Y/Y	Y	Y	Y/Y	Y [3]/Y	Y	Y/Y	4	Y/Y	Y/Y	2	15,000	623
n/a	0	0	N/Y	N	N	N/Y	N/Y	N	Y/Y	3	N/Y	N/Y	1	n/a	624
1	0	1/1	Y/Y	N	N	N/Y	Y/Y	N	N/Y	3	N/N	N/N	2	4000	625
9	0	0	Y/Y	N	Y	Y/Y	Y/N	Y	Y/Y	4	N/Y	N/Y	2 [8]	5000	625
3	0	0	Y/Y	N	N	Y/Y	Y/N	Y	N/Y	3	N/Y	N/Y	1	n/a	626
4	0	1/3	Y/Y	N	N	Y/Y	Y [3]/Y	Y	N/Y	3	Y/Y	Y/Y	2	10,000	627
11	0 [4]	1/8	Y/Y	N	N	Y/Y	Y [3]/Y	Y	Y/Y	3	Y/Y	Y/Y	2	10,000	627
4	0	0	Y/Y	Y	N	Y/Y	Y/Y	Y	Y/Y	4	N/Y	N/Y	1	12,500	628
6	0	0	Y/Y	N	N	N/Y	Y/Y	Y	Y/Y	4	N/Y	N/Y	1	15,000	628
8	0	1/8	Y/Y	Y	N	N/Y	Y/Y	Y	Y/Y	5	N/Y	Y/Y	1	9000	629
8	0	1/8	Y/Y	Y	N	N/Y	Y/Y	Y	Y/Y	5	N/Y	Y/Y	1	9000	629

[7] 47/134 lines per minute at 80 characters per line.
[8] One year on printhead.

For more information about all products in this table, circle reader service no. 901.

Dot Matrix Printing: Lower Costs by the Page

Dot matrix printers not only cost less than ink jets or lasers, they're cheaper to use. To compare the per-page costs of dot matrix, ink jet, and laser printers, we selected three popular models in each category. We asked the manufacturers for the list prices of their consumables. Using the example of a typical business letter (1200 characters of letter-quality, 12-point Courier text with 1-inch margins on each side), we figured out how much it would cost to print that letter on each printer. To project yearly costs, we multiplied the per-page costs by 5000 pages—the typical business user's yearly output.

The result: While paper costs are the same for each technology (about $0.015 per page), dot matrix consumables—the inked ribbons—could save you over $100 a year compared with ink jet cartridges or laser printer toner.

		Consumable	Cost	Lifetime (pages)	Per page	Yearly
Dot matrix	Epson LQ–870	cloth ribbon	$7.00	1667	$0.004	$21.00
	IBM PPS II 2390	cloth ribbon	$13.50	1458	$0.009	$46.29
	Panasonic KX-P1124i	cloth ribbon	$12.99	1250	$0.010	$51.96
Ink jet	Canon BJ–300	ink cartridge	$28.00	833	$0.034	$168.00
	HP DeskJet 500	ink cartridge	$19.95	500	$0.040	$199.50
	IBM ExecJet	ink cartridge	$28.00	833	$0.034	$168.00
Laser	Epson ActionLaser II	toner [1]/drum	$125.00/$175.00	5000/30,000	$0.031	$154.17
	LaserJet IIP plus	toner [2]	$95.00	3500	$0.027	$135.71
	Panasonic KX-P4420	toner/drum developer Total	$49.00/$190.00 $120.00	5000/13,000 20,000	$0.025 $0.006 $0.031	$122.08 $ 30.00 $152.08

[1] Integrated toner-developer. [2] Integrated toner-drum.

The Paper Game

Using a dot matrix printer does not mean that you're stuck with tractor-fed paper. Virtually all these printers let you feed paper manually, and most give you at least the option of a sheet feeder. If you are going to use both single sheets and continuous forms, look for form parking, which pulls the continuous form paper out of the way. If you print multipart forms, make sure the printer has sufficient pin-firing power: Most can print on four-part forms, but some can handle six.

Finally, pick a printer that offers a couple of paper path options. If you work with labels, envelopes, and other heavy stock, the straighter the path the better, so look for printers with "front L," "rear U," or bottom-feed paths. A choice of front, rear, bottom, and top feeds will make it easier to work with both continuous form paper and single sheets and will give you some flexibility.

The Final Impact

The lowest street price for a laser right now is about $600; if you shop around, you can find several high-quality dot matrixes for under $300.

If you need to have high-quality graphics output or top letter quality print speeds, there's no arguing against buying a laser. But if your needs are either more modest (everyday drafts and standard letters) or more specialized (wide format paper or carbon copies), an affordable dot matrix printer is still the right machine for the job.

Scott Spanbauer is a contributing editor for PC World. *He can be reached on PC World Online (see page 8 for more information).*

WHERE TO BUY

Advanced Matrix Technology Inc.
800/637-7878,
805/388-5799 (fax)

ALPS America
800/825-2577,
408/432-6000

Brother Int'l Corp.
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Bull HN Information Systems Inc.
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Citizen America Corp.
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310/453-0614

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508/493-5111

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Fujitsu Computer Products of America, Inc.
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Genicom Corp.
800/443-6426,
703/949-1392 (fax)

Lexmark Int'l, Inc.
800/426-2468

Mannesmann Tally Corp.
800/843-1347,
206/251-5524

NEC Technologies, Inc.
800/632-4636,
508/264-8000

Okidata
609/235-2600,
609/778-4184 (fax)

Olivetti Office USA
908/526-8200,
908/526-8405 (fax)

Panasonic Communications and Systems
800/742-8086,
201/348-7000

Printronix Inc.
800/826-3874,
714/660-8682 (fax)

Seikosha America Inc.
800/338-2609,
201/327-7227

Shinwa of America, Inc.
708/470-1600,
708/470-0858 (fax)

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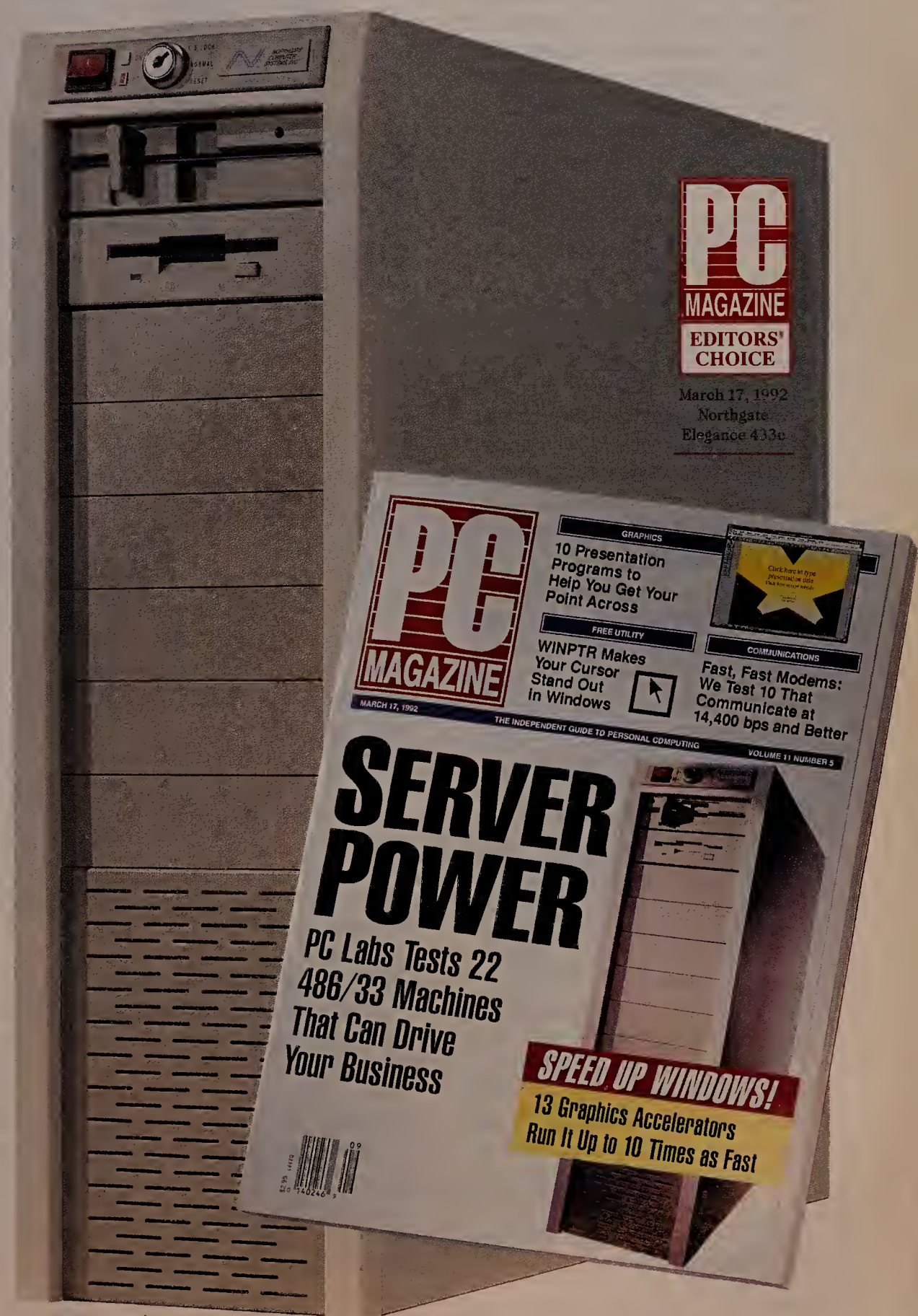

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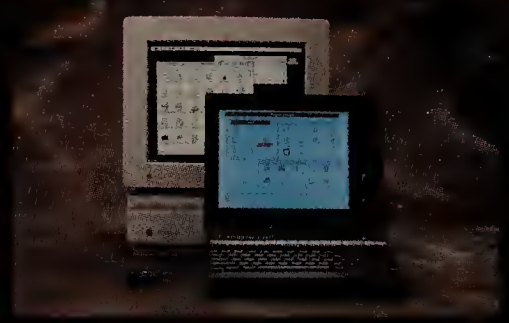

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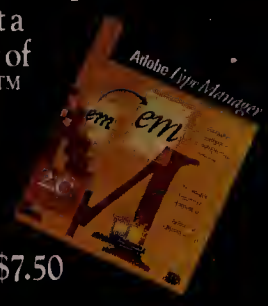

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THE HELP SCREEN

BY KARL KOESSEL AND ROBERT LAURISTON

PC World offers answers and advice at every level

Q. *A technician from the company that sold me my new 386 had me edit my DOS 5.0's CONFIG.SYS to make better use of the system's 4MB of memory. I've enclosed a printout of the file. Does this setup make the best use of my system's memory?*

FRANK OGLE
HUNTSVILLE, ALABAMA

A. Before we discuss DOS 5.0's memory management capabilities, let's consider the memory in your system. Memory that occupies addresses from 0 to 640K is called conventional, or base, memory because it was the only kind available to hold DOS, programs, and data in the original PC and XT.

The rest of your 4MB occupies addresses beyond 1MB and is called extended memory because the AT's 286 processor had addresses that extended beyond the 1MB range of the processors used in PCs, XTs, and their clones. The first 64K of extended memory is called the high-memory area (HMA). A programming technique called segmented addressing allows it to be used differently than the rest of extended memory.

Separating conventional and extended memory is the 384K upper memory area (UMA), or upper memory blocks (UMBs). Addresses in this range have traditionally been used for system resources such as video RAM, which holds your screen's image, as well as the system BIOS, video BIOS, and hard disk controller ROMs, which hold support code. Other peripherals, such as network boards, may also have ROMs that require unique addresses in the UMA.

Finally there's expanded memory, originally made up of banks of memory and a special memory manager on an add-in card. Programs written to talk to the memory manager could use one bank at a time, through a page frame addressed in the UMA, to gain access to more than the standard 640K. Since the 386 and 486 have built-in memory management capabilities, they can, with the help of a driver, use extended memory to emulate expanded memory.

Now let's set up DOS 5.0 so that it makes the best use of your system's memory by using the least amount of conventional memory. We recommend revising your CONFIG.SYS as shown in **LISTING 1**. Since you're running a disk cache (SmartDrive), you can cut BUFFERS down to 4. Allowing for 30 files to be open at once is appropriate because you use *Windows*. The next line combines DOS=HIGH and DOS=UMB into one command. HIGH loads all but 18K of DOS 5.0 into the HMA (provided that CONFIG.SYS installs HIMEM.SYS), and UMB tells DOS to maintain a link between conventional memory and the UMA (if CONFIG.SYS also installs EMM386).

HIMEM.SYS, which must be the first DEVICE command, manages extended memory, ensuring that two programs don't try to use the same section and crash your system. EMM386, which must precede DEVICEHIGH entries, manages the extended memory it maps to the UMA. This memory may be used for emulating expanded memory and/or for loading device drivers and memory-resident programs (TSRs) high. If you have no need for expanded memory, include the parameter NOEMS. Some DOS programs, such as *WordPerfect*, *1-2-3 2.x*, and *Quattro Pro* can use expanded memory; to make expanded memory available, replace 'NOEMS' with '512 RAM' (raise or lower the number to change the amount of K used). We've also incorporated the /I (Include) switches to make more of the UMA available to DOS. Unless you have an esoteric video board, the first Include range should present no problem. However, some systems may not let *Windows* use any of the F segment (change F7FF to EFFF) and possibly the E segment (take the second range out altogether).

DEVICEHIGH is the CONFIG.SYS command to load device drivers high so they don't use up conventional memory. However, if all the programs you're run-

```
BUFFERS=4
FILES=30
DOS=HIGH,UMB
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE NOEMS /I=B000-B7FF /I=E000-F7FF
DEVICEHIGH=C:\DOS\SETVER.EXE
DEVICEHIGH=C:\DOS\SMARTDRV.SYS 1024 512
```

LISTING 1: This sample CONFIG.SYS file demonstrates how to use DOS 5.0 memory management capabilities to load device drivers high, load most of DOS high, and make high memory available for TSRs.

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Look at the comparison below. We took the information from the Peachtree Times Newsletter in which Peachtree informed its customers of third party add-ons available for their software. These add-ons are not available from Peachtree, nor are they guaranteed by Peachtree, but they are expensive. Most of the add-ons in Peachtree's newsletter are standard features in ACT-Plus. We listed and added up the cost of the add-ons that are free in ACT-Plus. As you can see, you would have to pay over $6,900 to make Peachtree do what ACT-Plus does.

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Center titles on Income Statement	$99.00	Enter invoice to ask for job number	$350.00	Additional shipping address	$149.00
Subsidiary Schedule Account Titles	$99.00	Eliminate YTD fields on check stubs	$99.00	Short invoice format	$99.00
Suppress zero balance accounts	$99.00	Remove pay rate from check stub	$99.95	Labels AR and sales invoice	$99.00
Account range totals	$99.00	Print name and address on check stub	$99.95	Change invoice date	$99.00
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AR aging report with 91 column	$99.00	Use history for check register	$75.00	Import sales invoices	$199.00
AR customer file expansion	$149.00	GL Transaction import	$199.00	Sales invoice message	$99.00
AR aged record report with variable sort	$99.00	Default detail trial balance	$69.95	Update on auto invoices	$99.00
Service charge by percentage or amount	$49.00	Print negative amounts in parentheses	$99.00	Change ship to I.D.	$99.00
AR statement blank reference	$99.00	Enhanced income statement	$99.00	Pay stubs with rates and hours	$99.00
Sort AR aging report by customer name	$99.00	Suppress zero balance accounts	$99.00	Automatic tax deduction per hours	$149.00
Default to YES for print invoice	$79.00	Department titles and totals	$99.00	Payroll check export program	$99.00
Sales invoice with qty, description, price	$99.00	Processing of hand checks	$99.00	Void payroll check	$99.00
Insurance company invoice format	$149.00	No check number on checks	$79.00	Discount on purchase order	$99.00
Monthly invoice register	$99.00	Multiple default GL accounts	$99.00	Import inventory items	$199.00
Delete previously posted invoices	$99.00	AR statement without aging	$79.00	Uses history for employees	$75.00
Post comments to AR	$99.95	AR transaction import	$199.00		
Print description and amount	$99.95	AR aging and past due report	$65.00	**Total**	**$6931.65**

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ning are compatible with DOS 5.0, you don't need SETVER and should remove its DEVICEHIGH line.

A disk cache like SmartDrive speeds up the loading of *Windows* and programs and quickens access to data base records. But it may slow down some other things you do in *Windows* because it uses quite a chunk of RAM. We suggest you try different cache sizes (we've set it to a 512K minimum) and even disable it (remember to reset BUFFERS to 20 or 30) to compare how its settings affect your overall *Windows* experience.

You should be using the latest versions of HIMEM.SYS, EMM386, and SMARTDRV.SYS, so we've changed the path for those commands to the DOS 5.0 directory, which was released after *Windows* (assuming you're not yet using *Windows 3.1*).

You can free even more conventional memory by using LOADHIGH (or its abbreviation, LH) in your AUTOEXEC.BAT. To load NetWare drivers into the UMA, for instance, you might use the commands LH C:\NET\IPX and LH C:\NET\NET5.

DOS 5.0's MEM command is useful when you experiment with memory configuration. Enter **MEM /C | MORE** at the DOS prompt when *Windows* isn't running to see exactly what's in base and upper memory and to find out if DOS is using the HMA.

Q. *I have a super-VGA board with 512K RAM. What are the benefits of upgrading to 1MB? Would more video memory give me better performance, particularly under* Windows?

CARL GUSSGARD
FREMONT, CALIFORNIA

A. Upgrading your super-VGA board to 1MB won't improve the performance of *Windows* or most other software. With 512K RAM, most super-VGA boards display 16 or 256 colors in standard 640 by 480 VGA or 800 by 600 super-VGA resolutions, or 16 colors at 1024 by 768. The only thing 1MB of video memory really gives you is the ability to display 256 colors at 1024 by 768. Because it takes longer for your CPU to process more pixels or more colors, running *Windows* in a 256-color 1024 by 768 mode will actually slow it down, albeit less noticeably on faster systems.

Q. *Can I send a fax without a fax-modem? That is, is there software that will let me send a fax directly from my Hayes-compatible 2400-baud modem?*

DREW SPENCER
ARLINGTON, TEXAS

A. You can use your modem to send text messages to services such as CompuServe and MCI Mail, which let you address an E-mail message to a fax machine's telephone number. The message is then delivered by one of the service's fax-modems. However, almost every 2400-baud modem sold today also has fax-sending capability. Since you can

Get A Life

pick one up for under $100, it might be worth upgrading.

Q. *I do a lot of group presentations. These often include videotapes, and I'd like to use a big-screen TV for PC-based presentations, too. What do I need in order to get my computer's VGA output onto a TV screen?*

GARY HARRIS
HARRISBURG, SOUTH DAKOTA

A. The cheapest, easiest way we've found to turn VGA into the NTSC signal that a large-screen TV's video-in jack accepts is the DemoKey from United Int'l Development. Just plug this pocket-size gadget into your PC's VGA output and run a standard RCA or Super-VHS video cable (like you'd use to hook up a VCR) from it to the TV.

WHERE TO BUY

DemoKey
United Int'l Development
210 Post St. #1118
San Francisco, CA 94108
LIST PRICE: $299
415/392-3714, 415/392-6515 (fax)
Reader service no. 833

Q. *Is there a way to DISKCOPY a 5¼-inch high-density disk to a 3½-inch high-density disk? Some of our software comes only in the 5¼-inch format, and we want to install it on computers that have 3½-inch drives. Currently I copy the 5¼-inch disk to a scratch subdirectory on my hard disk, then copy that directory to the 3½-inch disk, but it seems like there should be a way to accomplish this in one step. Also, the software installation programs don't always work once copied to 3½-inch disks. Is there some special trick to copying compressed files?*

JUDITH A. NEDROW
CLIFTON SPRINGS, NEW YORK

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DISKCOPY can only reproduce exact copies. Because the disks have different formats, you can't use DISKCOPY. However, you can use XCOPY. If your 5¼-inch drive is A: and your 3½-inch is B:, use the DOS command **XCOPY A:\ B:\/S/E** (if your 3½-inch drive is A:, just switch the command's drive letters).

The command copies all the files in the specified source directory (in this case, the root of drive A:) to the specified directory on the target disk (in this case, the root of drive B:). The /S switch tells XCOPY to copy the files from the subdirectories under the specified source directory to the same subdirectories under the specified directory on the target disk. XCOPY will create the target subdirectories if they don't

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already exist. The /E tells XCOPY to also duplicate the empty subdirectories on the source onto the target (/S doesn't bother creating subdirectories that will remain empty). Note that this command can also copy 3½-inch disks to 5¼-inch disks, but if the source disk holds more than 1.2MB of data, copying will stop when the target disk is full.

As far as DOS is concerned, a compressed file is just like any other file. You can safely copy it with COPY, XCOPY, DISKCOPY, or any file utility you wish. If the installation utility doesn't work when using the 3½-inch disks, the problem may be that it is looking for a specific volume label on each disk. Use the DOS command **DIR /P** to display the original disk's label on your screen's first line, and the LABEL command to duplicate it on the new disk.

Q. *I bought a 33-MHz 386 system recently and used two diagnostic utilities to check its speed.* Norton Utilities 6.0*'s System Info utility says the system runs at 33 MHz with turbo on and 16 MHz with turbo off, but the* Landmark CPU Speed Test 1.14 *says 53 MHz and 25 MHz. Which test is accurate?*

SALEH ABBAS
JEDDAH, SAUDI ARABIA

A. "53 MHz" doesn't indicate how fast your system is running, but rather how fast you'd have to run an IBM AT's 286 processor to equal the performance of your 33-MHz 386 CPU. Although the number is not the actual speed at which your CPU is running, it's still an entertainingly impressive number. For a more meaningful speed rating, you can divide 53 MHz by the original AT's 6-MHz speed, to find that your system's CPU performs 8.83 times faster than a 6-MHz 286. And when running in non-turbo mode, your CPU performs 4.166 (25 MHz/6 MHz) times faster than a 6-MHz 286. *Norton*'s System Info, on the other hand, is attempting to report the clock speed of your system. Obviously, 33 MHz in turbo mode is correct. The 16 MHz in non-turbo mode, however, is questionable. Non-turbo mode is supposed to slow a system to 8 MHz for compatibility with older software and hardware. System Info may be reporting twice what it should because it's being run on a 386 instead of a 286.

Q. *I am unable to run* AutoCAD 10 *under* Windows 3.0. *What's the problem and how can I correct it?*

O. CHUNG
PARAMARIBO, SURINAM

A. The Phar Lap DOS extender that *AutoCAD* uses conflicts with *Windows'* HIMEM.SYS memory manager. A patch available on CompuServe fixes the problem. Download NEWDX.ZIP from library 10, Applications, of the *AutoCAD* section of the AUTODESK forum. If you don't have access to CompuServe, you should be able to get Autodesk to mail you a copy. Note that a *Windows* version of *AutoCAD 11* is now available.

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Circle 106 on reader service card

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Reader Frederick S. Holmes, Jr., reminds us that we omitted one excellent solution from January's "Using 360K Disks in a High-Density Drive." With *CPYAT2PC* from Microbridge Computers Int'l, you can use your 1.2MB drive to copy files to standard 360K disks that can be read reliably by older systems' 360K floppy disk drives.

CPYAT2PC doesn't give your applications the capability to save reliably readable files—you must use it to copy saved files. Also, while you can use wild-card characters to copy groups of files, you must be logged on to the source file's directory since you can't specify the path. But *CPYAT2PC*, which is available directly from Microbridge Computers or from outlets such as Egghead, ComputerLand, and Entré, does solve the problem of moving files (including those larger than 360K) from systems with 1.2MB floppy drives to systems using 360K drives.

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Karl Koessel is the technical editor and Robert Lauriston a contributing editor for PC World.

POWER TIP NO. 252

Printing Backward in Ami Pro

If your laser printer delivers its output face up, you're probably tired of rearranging your hard copy. If you use *Ami Pro 2.0*, you don't have to. To print a file from the last page to the first, select *File•Print•Options*, click on the Reverse Order box, and select *OK•OK*.

Dan Pirkey
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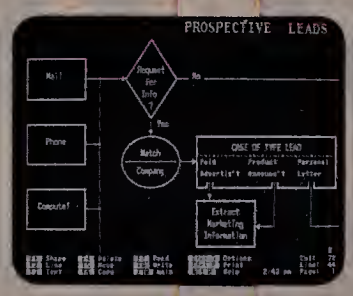

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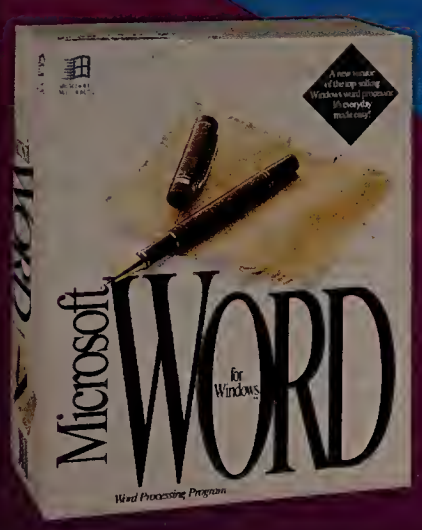

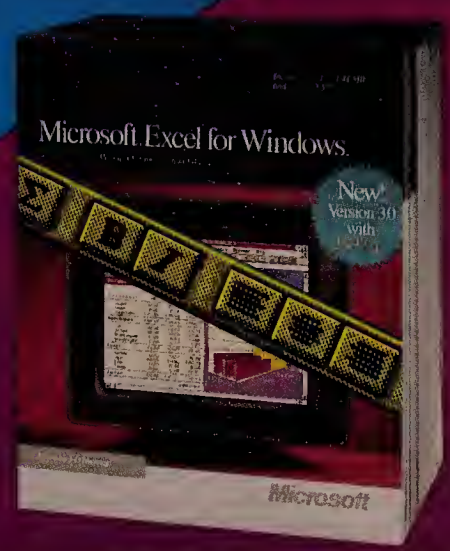

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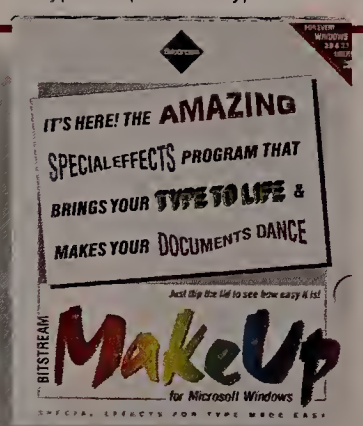

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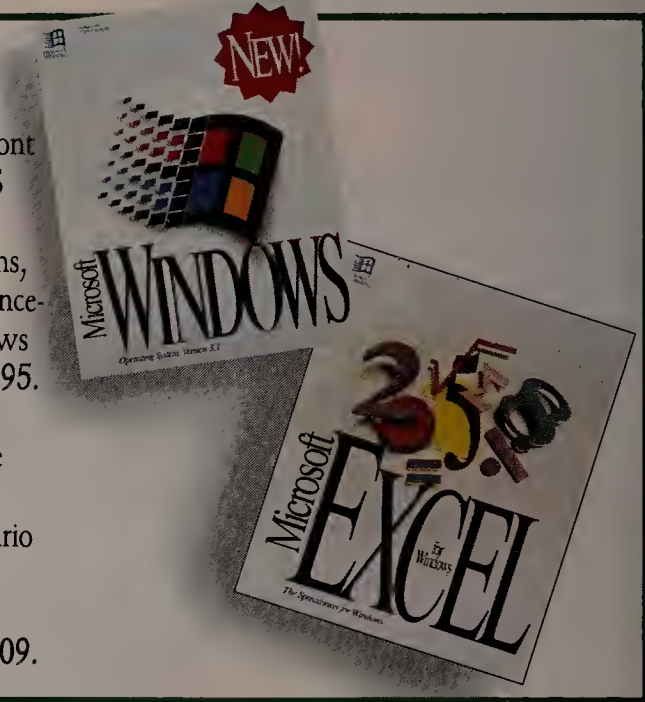

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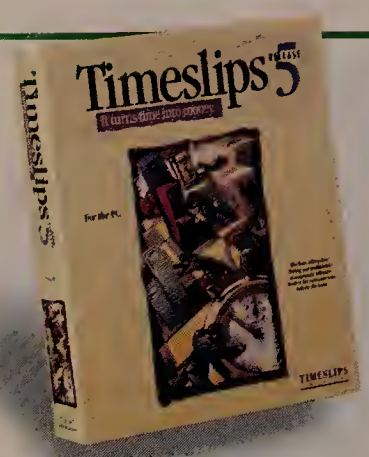

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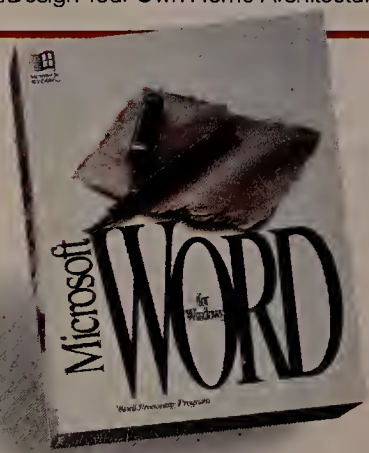
5037 ☐TimeSheet Pro for Windows . . . . . 135.
5698 ▣TimeSlips Release 5 . . . . . 189.
Timeworks ... NCP
6253 ▣Publish-It! 2.0 . . . . . 85.
Tool Technology ... NCP
3863 WinTools 1.0 for Windows *(3½" only)* . . . 119.
Touchstone Software ... NCP
7420 ▣Check It 3.0 . . . . . 85.
Traveling Software ... NCP
4407 ▣LapLink Pro 4.0 . . . . . 95.
WordPerfect Corporation ... NCP
4214 ▣WordPerfect Office PC . . . . . 89.
3804 ☐WordPerfect 5.1 . . . . . 269.
3494 ☐WordPerfect 5.1 for Windows . . . . . 279.
Wordstar ... NCP
5148 ☐Wordstar 7.0 for DOS . . . . . 269.
3442 ▣Wordstar 1.0 for Windows. . . . . 279.
XTREE ... NCP
6161 ▣XTree Gold 2.5 . . . . . 95.

RECREATIONAL/EDUCATIONAL

Abracadata ... NCP
3641 ▣Design Your Own Railroad . . . . . 39.
5594 ▣Sprout 1.0 *(May '92)* . . . . . 35.
5591 ▣Everybody's Planner 2.0 . . . . . 49.
3629 ▣Design Your Own Home-Architecture 3.0 49.

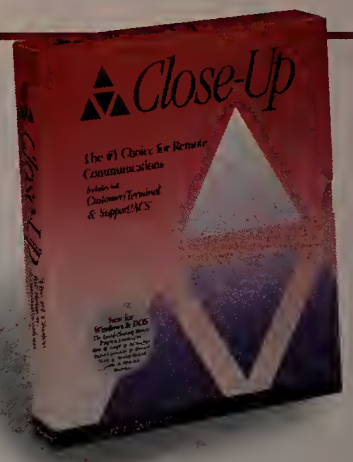


Microsoft ... NCP
6195 ▣ *Word 2.0 for Windows*–Everyday tasks are easy with the customizable toolbar, drag & drop movement of text, & instant character & page formatting from the Ribbon & Ruler. Includes drawing, charting & WordArt . $309.

Broderbund ... CP
3340 ▣Kid Pix . . . . . $35.
8068 ▣Where in World is Carmen Deluxe. . . . . 49.
1836 ▣Where in America's Past is Carmen . . . 39.
5851 ▣SimCity from Maxis. . . . . 29.
4388 ☐SimAnt from Maxis . . . . . 39.
4411 ▣SimEarth for Windows from Maxis . . . . 45.
Davidson & Associates ... NCP
3947 ▣Math Blaster Plus . . . . . 29.
4183 ▣KidWorks . . . . . 29.
Electronic Arts ... NCP
4534 ▣Mavis Beacon Teaches Typing 2.0 *(CP)* 35.
3031 ▣Mavis Beacon for Windows. . . . . 45.
3023 ▣ChessMaster 3000 . . . . . 35.
3032 ▣ChessMaster 3000 for Windows . . . . . 39.
Harvard Associates ... NCP
2324 ▣PC Logo 4.0 . . . . . 59.
HyperGlot Software ... NCP
(French, German, Italian, Spanish available.)
☐Word Torture for Windows . . . . . ea. 34.
☐Word Torture 3.0 . . . . . ea. 29.
ICOM Simulations ... NCP
3717 Sherlock Holmes, Consulting Detective *(CD)* 39.
Knowledge Adventure ... NCP
1483 ▣Sports Adventure 1.0 . . . . . 55.
3861 ▣Knowledge Adventure 1.0 . . . . . 55.
Microsoft ... NCP
7881 ☐Entertainment Pack I for Windows. . . . . 29.
4079 ☐Pack II. . . . 29. 4077 ☐Pack III. . . . 29.
2858 ☐Flight Simulator 4.0. . . . . 39.

Hayes ... 2 years
1345 *OPTIMA 24 Modem*–An affordable high-speed V.42bis modem with the reliability and quality that made Hayes famous. Supports throughput up to 9600 bps. Incl. Smartcom EZ communication software . . . . . $155.

Penton Overseas ... NCP
▣VocabuLearn/ce Levels I & II *(French, Italian, German, Spanish, Russian, Hebrew and Japanese)* . . . . . ea. 35.
Personal Training Systems ... NCP
Training tutorials - beg. to adv. for Windows, Excel, PageMaker, WordPerfect, Ami Pro, Microsoft Word & Lotus 1-2-3 *(3½")* . ea. 65.
Sierra ... CP
9466 ☐Space Quest IV *(VGA)*. . . . . 45.
3193 ☐Police Quest III *VGA)*. . . . . 45.
Software Marketing Corp. ... NCP
5145 ▣Bodyworks 1.0 . . . . . 45.
Software Toolworks ... NCP
3294 ▣Game Pak *(5 games in one)* . . . . . 32.
5032 Miracle *(piano teacher) (incl. kybd.)* . . . . 325.
Spectrum Holobyte ... NCP
4834 ▣Super Tetris or 4833 for Windows. . ea. 29.
Toyogo ... NCP
5138 ▣Go Master Deluxe 5.0 for Windows. . . . 99.
5143 ▣Go Master Deluxe 5.0. . . . . 99.
True BASIC, Inc. ... NCP
▣Kemeny/Kurtz Math Series . . . . . ea. 45.
Walt Disney Computer Software ... CP
2629 ▣Mickey's 123's . . . . . 29.
2624 ▣Mickey's ABC's . . . . . 29.
4398 ▣The Animation Studio . . . . . 79.
4416 Sound Source . . . . . 29.



Norton-Lambert ... NCP
2753 ☐ *Close-Up for Windows & DOS Dual Pack 4.0–PC Magazine*'s Editors' Choice for controlling PCs miles away by modem. *PC World*'s "Best Buy" for remote communications . . . **intro. price until 6/30/92 $129.**

HARDWARE

Warranties listed next to manufacturer.

American Power ... 2 years
7108 Smart UPS 400 . . . . . 339.
7105 Smart UPS 600 . . . . . 439.
3858 Back-UPS 400 . . . . . 179.
3823 Back-UPS 600 . . . . . 295.
Appoint ... limited lifetime
2469 Thumbelina PC . . . . . 62.
2480 MousePen Pro PC . . . . . 62.
ATI Technologies ... 2 years
9821 VGA Basic-16 *(640 x 480, 16 colors)*. . . . 65.
9985 VGA Integra *(1024 x 768, 16 colors)* . . . . . 89.
2706 VGA Wonder XL *(with 1 MB)*. . . . . 199.
2382 Graphics Vantage VGA *(with 1 MB)* . . . . 299.
9822 8514/Ultra *(with 1 MB) (requires VGA)*. . . 399.
2012 Graphics Ultra with VGA *(with 1 MB)*. . . . 479
1825 2400etc/i Modem *(with 9600 SendFax)* . 109.
9620 9600etc/e Modem . . . . . 369.
3902 Stereo•F/X . . . . . 145.
3900 VGA Stereo•F/X *(w/512K, upgrd. to 1 MB)* 279.
Boca Research ... 5 years
7150 BOCARAM/AT PLUS *(2 MB)*. . . . . 189.
7139 *(4 MB)* . . . . 279. 7138 *(8 MB)* . . . . 459.
6998 I/O Board for AT . . . . . 49.
6999 I/O Board for Microchannel *(S/S/P)*. . . . . 95.
8380 BasicVGA *(256K, 640 x 480)* . . . . . 49.
8381 SuperVGA *(1 MB, 1024 x 768)* . . . . . 115.
3859 2400 Internal Modem *(V.42, MNP Level 5)* 85.
2502 2400 Baud Internal Modem . . . . . 49.
4001 2400 Baud External Modem . . . . . 59.
Bravo Communications ... 2 years
7400 2 Position Laser Compatible Switch Box. 109.
Brown-Wagh ... 1 year
8578 Creative Labs Sound Blaster 109
2336 Creative Labs Sound Blaster Pro . . . . . 189.
Caere ... 1 year
8158 Typist Plus Graphics. . . . . 389.
Canon ... 1 year
We are an authorized Canon Service Center.
7894 BJ-10ex Printer *(4.6 lb.)* . . . . . 329.
7897 BubbleJet Ink Cartridge *(BJ-10ex)* . . . . . 23.
7896 BJ-10ex Sheet Feeder . . . . . 75.
Cardinal ... 1 year
2719 MB2296SR Internal Send/Receive Fax . . 95.
1132 386-SX-16 Motherboard ØK . . . . . 215.
1197 386-SX-25 Motherboard ØK. . . . . 239.
1480 Cardinal 9600 Internal Modem. . . . . 265.
2783 Cardinal 9600 External Modem . . . . . 299.
CH Products ... 1 year
7935 Game Card III Auto . . 33. 7341 MCA . . 49.
7340 FlightStick . . . . . 45.
CoStar ... 1 year
1418 AddressWriter. . . . . 479.
1947 LabelWriter II . . . . . 185.

PC Parade.

From Marlow to Main Street.
(Or, a decade of service to beat the band.)

Back in July of '82, shortly after the introduction of the IBM-PC, we marched (to the beat of a different drummer, of course) smack dab into the middle of the PC marketplace. Our idea was simple—to sell add-ons and software exclusively for IBM personal computers. Our first warehouse was even simpler—a closet in a converted sawmill in the one-horse (or was that a moose?) town of Marlow, NH (pop. 542 at the time). Our goals were rather modest, too—we just wanted to be the fastest, most convenient, and most reliable source for PC products anywhere on Planet Earth.

Over the last ten years, we've learned that our small-town values play pretty well across America. And that anything humans can do, our high-stepping raccoon mascots can do better. So as our first decade draws to a close, we'd like to thank all our customers for making it so successful. May it never rain on your PC parade!

We'll give you the shirt off our backs!

The Official PC Connection 10th Anniversary Shirt, that is. A collector's item that can be worn with pride and panache at road races, corporate volleyball games, and even user-group meetings. It's free to anyone who places an order of $750 or more between now and June 30. Specify S, M, L, XL or children's.

Display your micro muscles with the all-cotton PC Connection 10th Anniversary Shirt. One per customer. Not available to net accounts.

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to improve with age.

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Intel SatisFAXtion Modems–Fax from Windows or DOS as easily as you print. In 4 different performance ranges and prices. All include FAXability software. . . . . **see line listings.**

COVOX ... 1 year
5543 Sound Master II . . . . . 145.
Curtis ... lifetime
1708 Ruby-Plus SPF-2+ . . . . . 65.
7358 Command Center SPF-4 . . . . . 89.
Cyrix Corporation ... 5 years
MATH COPROCESSORS
9875 FasMath 83D87-25 . . . . . 159.
9876 FasMath 83D87-33 . . . . . 169.
9877 FasMath 83S87-16 *(SX compatible)* . . . . . 99.
Epson ... 2 years
We are an authorized Epson Service Center.
5555 AP-3250 *(80 col., 200 cps, 24 pin)* . . . . . 239.
1906 FX-850 *(80 col., 264 cps, 9 pin)* . . . . . 319.
1904 FX-1050 *(136 col., 264 cps, 9 pin)* . . . . . 449.
2358 LQ-570 *(80 col., 252 cps)* . . . . . 289.
2361 LQ-870 *(80 col., 330 cps)* . . . . . 489.
2357 LQ-1170 *(136 col., 330 cps)* . . . . . 669.
5184 LX-810 *(80 col., 180 cps, 9 pin)* . . . . . 185.
Hauppauge Computer ... 1 year
9034 33 MHz 386N Motherboard for AT *(1 MB)* 789.
3670 33 MHz 486 Motherboard for AT . . . . . 1229.
4008 Win/TV . . . . . 439.
Hayes ... 2 years
7391 ULTRA 96 Modem . . . . . 669.
5024 ULTRA 144 Modem . . . . . 799.
1345 OPTIMA 24 Modem . . . . . 155.
3522 OPTIMA 96 Modem . . . . . 389.
9884 Pocket Edition 2400 . . . . . 119.
Hewlett-Packard ... 1 year
3175 DeskJet 500C *(color) (with toner)* . . . . . 749.
3957 LaserJet IIP Plus *(with toner)* . . . . . 879.
9993 LaserJet IIIP *(with toner)* . . . . . 1099.
6754 LaserJet III *(with toner)* . . . . . 1599.
Intel ... 5 years
3864 14.4EX Modem . . . . . 549.
7880 9600EX Modem . . . . . 469.
1086 Matched Memory Classic Memory Brd. ØK 139.
6990 SatisFAXtion Model 100 . . . . . 99.
6992 SatisFAXtion Model 200 . . . . . 299.
5994 SatisFAXtion Model 400 . . . . . 399.
5995 SatisFAXtion Model 400E . . . . . 459.
5999 ▣FAXability Plus . . . . . 79.
3903 Matched Memory 4 MB *(PS/2)* . . . . . 199.
Matched Memory *(for LaserJet IIP, III, IIIP IIID)*
1810 1 MB . . . . . 89. 1787 2 MB . . . . . 149.
3076 Snap-In 386 *(for PS/2 50/60 & IBM AT)* . . 389.
MATH COPROCESSORS
3750 80387SX *(16 MHz 80386SX CPU's)* . . . . 129.
3830 80387SX-20 *(20 MHz 80386SX CPU's)* . 139.
5409 80387DX . . . . . 219.

Kensington Microware ... 1 year
Full line available. Partial listing.
4973 PowerTree 20 *(6 outlets, EMI/RFI Filtering)* $27.
2582 Master Piece Plus. . . . . 99.
2587 Master Piece Remote . . . . . 105.
7899 Expert Mouse *serial* . . 99. 7900 *bus* . . 115.
3311 MasterStand. . . . . 59.
3312 LaserStand *(for HP LaserJet)* . . . . . 125.
Keytronic ... 3 years
4518 101 Plus Keyboard . . . . . 99.
Kraft ... 5 years
5800 3 button Thunder Joystick . . . . . 29.
Logitech ... limited lifetime
3996 Trackman 2 *(combo)* . . . . . 84.
2343 Trackman Portable . . . . . 99.
7975 ScanMan 256 . . . . . 269.
1322 FotoMan *(camera for your PC)* . . . . . 549.
4727 Kids Mouse . . . . . 45.
3295 MouseMan *(combo)* 69. 9766 *(cordless)* 89.
Megahertz ... 5 years
3020 T224FM 96/24 Pocket Fax Modem . . . . 249.
1187 T324FM 96/24 Fax Modem *(Toshiba Lptps.)* 269.
Micron Technology ... 2 years
7595 2 MB Expansion for HP LaserJet IIP or III 119.

Pacific Data ... 1 year
5729 ☐*ProTracer*–A Printer/Plotter capable of producing fast laser quality A to C-size (17" x 22") CAD drawings & impressive text documents all at a breakthrough price **$1099.**

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7597 Microsoft Mouse *(bus or serial)* . . . . . 85.
2897 Mouse with Paintbrush *(bus or serial)* . . . . 99.
2898 Mouse with Windows 3.0 *(bus or serial)* . 149.
1896 Ballpoint Mouse *(serial only)* . . . . . 119.
MicroSpeed ... 1 year
2763 MicroTRAC *(serial & PS/2 interface)* . . . . . 57.
6330 PC-TRAC Trackball *(PS/2)* . . . . . 75.
6007 *serial* . . . . . 75. 6008 *bus* . . . . . 89.
Microtek ... 1 year
2736 ScanMaker 600G *(gray-scale scanner)* . . 759.
2739 ScanMaker 600Z *(color scanner)* . . . . . 1249.
Mouse Systems ... lifetime
3213 PC Trackball II *(serial)* . 65. 5609 *(bus)* . 77.
7878 PC Mouse III *(serial)* . . 69. 7877 *(bus)* . . 79.
5613 Little Mouse/PC *(serial)* . 69. 5601 *(bus)* . 77.
5978 PenMate . . . . . 209.
5979 NewPoint . . . . . 79.

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Practical Peripherals ... lifetime
2425 *PM14400FXSA Modem/Fax*–Get ultra high speed 14,400 bps data transmission as well as Group III S/R fax capabilities in one integrated and affordable package. Includes QuickLink II for modem and fax communications . . **$399.**

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3637 CDR-36M Portable CD-ROM Drive . . . . 399.
3651 CDR-73M CD-ROM Drive . . . . . 589.
2478 CD Gallery with CDR36 for PC . . . . . 579.
4252 Multisync 3FGX Monitor *(14")* . . . . . 689.
4249 Multisync 4FG Monitor *(15")* . . . . . 799.
Okidata ... 1 year
We are an authorized Okidata Service Center.
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3025 Toner Cartridge . . . . . 25.
Orchid Technology ... 4 years
7863 ProDesigner VGA IIS *(with 1 MB, includes RAMDAC chip)* . . . . . 189.
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6779 25 Cartridges in One! *(LJ II, IID, IIP, III, IIID)* 269.
Memory upgrade for LJ IIP, III, IIID, IIIP:
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Memory upgrade for LaserJet II/IID:
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9833 Pacific Page XL *(w/accelerator board)* . . 699.
3388 Pacific Page PE w/2 MB . . . . . 399.

Prometheus ... 2 years
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8090 Pacific Connect w/1.25 MB ..... $349.
5729 ProTracer *(personal CAD printer) (1 yr.)*. 1099.

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3203 Turbo Cool 200 ..... 149.
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3102 2400 Baud External Modem ..... 99.
8993 2400 Baud Internal Modem *(V.42 bis)* ... 115.
8994 2400 Baud External Modem *(V.42 bis)* .. 125.
8132 PM2400 Pocket Modem ..... 109.
2266 PM9600 Internal Modem ..... 275.
7934 PM9600SA Modem ..... 289.
2264 PM2400FX96 *(int. modem/fax)* ..... 95.
1344 PM2400FX96SA *(ext. modem/fax)* ..... 99.
3803 PM14400FX96 *(int. modem/fax)* ..... 359.
2425 PM14400FXSA *(ext. modem/fax)* ..... 399.

Prometheus ... 2 years
1222 ProModem Ultima Home Office ..... 489.
6009 OmniLink Laser ..... 425.

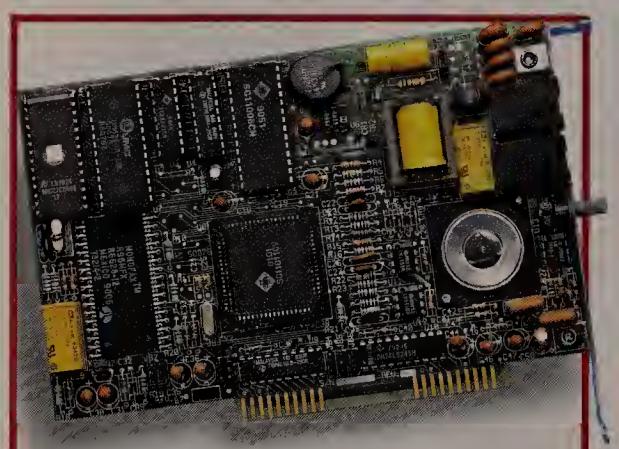
Targus ... lifetime
1305 Universal Notebook *(computer case)* .... 69.

TheComplete PC ... 2 years
5828 TheComplete Communicator ..... 299.

Tripp Lite ... 2 years
6199 Isobar 4-6 *(4 outlets, Gold Seal Warranty)*. 49.
6200 Isobar 6-6 *(6 outlets, Gold Seal Warranty)*. 59.
6201 Isobar 8-12 *(8 outlets, Gold Seal Warranty)* 69.
5549 BC400 Battery Backup ..... 169.

Video 7 ... 7 years
9768 VRAM II VGA 1 MB ..... 329.

Zoom Telephonics ... 7 years
1307 Int. 2400 Baud w/9600 Baud Fax Modem 99.
1178 Ext. 2400 Baud w/9600 Baud Fax Modem 99.
1181 2400 Baud V.42 bis Modem *(2 year)* .... 115.
3574 Ext. 2400 Baud V.42/9600 Baud Fax ... 145.
3386 FaxModem AFC *(2400 baud modem, 9600 send, 4800 receive fax)* ..... 69.
4430 FaxModem AFX ..... 79.
4429 FaxModem V.32bis *(internal)* ..... 259.
4428 FaxModem V.32bis *(external)* ..... 289.



Prometheus ... 2 years
1222 *ProModem Ultima Home Office*–Integrated system of data, fax & voice. 14,400 bps data modem with V.42bis/MNP 5 data compression & error correction, plus 9600 bps send/receive fax, & full voice capability ..... $489.

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4354 Jumbo 250 Tape Backup ..... 269.

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2339 CP30104 120 MB IDE HD *(19 ms)* ..... 399.
1337 CP3204 200 MB IDE HD *(16 ms)* ..... 599.

IOMEGA ... 1 year
We are an authorized Iomega Service Center.
2224 Bernoulli II Transportable 90 MB ..... 799.
2516 Internal 90 MB Bernoulli ..... 799.
2500 PC2B Controller ..... 199.
2530 90 MB Cartridge ..... 149.
2467 90 MB Cartridge Tripak ..... 439.

Mountain Network Solutions ... 2 years
2917 40-120 MB Internal Tape Drive ..... $259.
3812 FS8500 IDE Tape Backup *(304M)* ..... 569.
6153 DC2120 Tape Cartridge *(5 pack)* ..... 149.

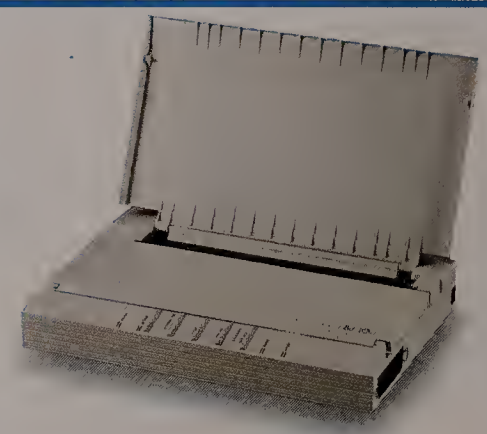
Pacific Rim ... 1 year
1304 1.2 MB External *(for any parallel port)* ... 239.
2761 1.44EX MB External *(for any parallel port)* 239.

Quantum ... 2 years
8304 Plus Hardcard II XL 50 MB *(9 ms)* ..... 299.
8287 Plus Hardcard II XL 105 MB *(9 ms)* ..... 449.
4060 105 MB Drive Kit for MC PS/2's *(13 ms)* . 789.

TEAC ... 1 year
6951 1.2 MB Drive for AT ..... 65.
4670 1.44 MB Drive for PC/XT *(3½")* ..... 59.
4326 1.44 MB Drive for AT *(3½", w/Bastech)* .. 79.
4951 720k Drive for PC/XT *(3½")* ..... 55.
4414 3½"/5¼" Dual Floppy Drive ..... 165.

MEMORY

6556 256k DRAM *(100 ns, set of 9)* ..... 19.
5510 1 MB x 9 SIMMs *(80 nanosecond)* ..... 45.
2497 4 MB x 9 SIMMs *(80 nanosecond)* ..... 169.
5746 1 MB Chips *(80 ns, set of 9)* ..... 45.



Canon ... 1 year
7894 *BJ-10ex Printer*–New enhanced version of the popular 4.6 lb. printer provides laser-like print quality (up to 360 dpi) on plain bond paper, envelopes or transparencies. Available in white or gray ..... $329.

AddStor ... NCP
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3M ... lifetime
3943 DC2000 .... 17. 1581 DC2120 .... 24.

Fuji ... lifetime
2214 3½" DS Disks *(10)* ... 9. 2242 *(50)* ... 32.
2215 3½" HD Disks *(10)* ... 15. 2241 *(50)* ... 59.
2243 3½" DS Color Disks *(Qty. 10)* ..... $10.
2239 3½" HD Color Disks *(Qty. 10)* ..... 18.
Fuji ¼" Data Cartridges ..... call

Sony ... lifetime
3292 5¼" HD Disks *(Qty. 10)* ..... 11.
3297 3½" DS Disks *(10)* ... 9. 6148 *(30)* ... 25.
3298 3½" HD Disks *(10)* ... 15. 6375 *(30)* ... 42.
8185 QD2040 Tape Cartridge ..... 14.
1895 QD2120 ..... 21.
6715 QD6150 .... 23. 1602 QD6250 .... 29.

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- We accept VISA and MASTERCARD.
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- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax, except Ohio residents (please add applicable tax).
- All U.S. shipments insured; no additional charge.
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- Upon receipt and approval, personal and company checks clear the same day for immediate shipment of your order.
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- To order, call us Monday through Friday 8:00 a.m. to 1:00 a.m., or Saturday 9:00 a.m. to 5:30 p.m. Eastern Time. You can call our business offices at 603/446-3383 Monday through Friday 9:00 a.m. to 5:30 p.m.

IOMEGA ... 1 year
2224 *Bernoulli II Transportable 90 MB*–Rugged and built to last, this drive will absorb 1000 g's of shock and provide 90 MB of portable storage. Awards from *Byte* and *InfoWorld*. Requires adapter card ..... $799.

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Note: Accounts on net terms pay actual shipping.

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- For heavy hardware items such as printers, monitors, Bernoulli Boxes, etc. pay actual charges. Call for UPS 2nd-Day & Next-Day-Air.
- For all other items, add $3 per order to cover UPS Shipping. For such items, we automatically use Airborne Express at no extra charge if you are more than 2 days from us by UPS ground.

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- Call 603/446-0003 for information.

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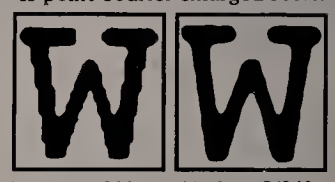
Oscar statuette © A.M.P.A.S. ®

When C. David Piña created the graphics for the 63rd Annual Academy Awards, he cast his NewGen™ printer to play a vital supporting role.

Why NewGen? "We print a lot of grey scale, line and type images. NewGen delivers — beautifully. What I see on the screen is precisely what I get. And it's fast too; we don't wait for documents anymore."

Resolution close up,
13 point Courier enlarged 500%.



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For Dealer Inquiries
Circle 159 on reader service card

WORD PROCESSING CLINIC

BY GEORGE CAMPBELL

Tips for getting the most out of your word processor

Q. *I use different margin settings in* WordPerfect 5.1 *for different word processing clients. One of my clients needs a 2-inch left margin and a .31-inch right margin. Whenever I load one of these documents, it starts up with the default* WordPerfect *margins instead. To get my new margins, I have to press* **<Page Down>** *and then* **<Page Up>**. *I'm using the normal* **<Shift>-<F8>LM** *formatting commands. What should I be doing differently?*

MARY E. CUMMINGS
SCHENECTADY, NEW YORK

A. The problem is that you're inserting a second set of margins in addition to *WordPerfect*'s default margins. Instead, you should remove the default margins and replace them with your own. Here's how to do that.

Start by setting the initial margin codes. Press **<Shift>-<F8>DC** to open the initial codes window, then press **<Shift>-<F8>LM**. Type the size of your left margin, press **<Enter>**, then type the size of the right margin and press **<Enter>** again. Press **<F7>** until you return to your document. Now that you've removed the defaults and entered the margins you want associated with the document, whenever you retrieve the document, you'll find that the margins are preset.

Q. *When I'm working in* Word for Windows 2.0, *I have found that I sometimes mysteriously lose text that I've already typed. If I have some text highlighted on screen and then type some additional text, all the text that I've highlighted disappears. That sort of problem never happened when I was using* Word 5.0. *Where in this process am I going wrong?*

ADA YAKAL
NORMAL, ILLINOIS

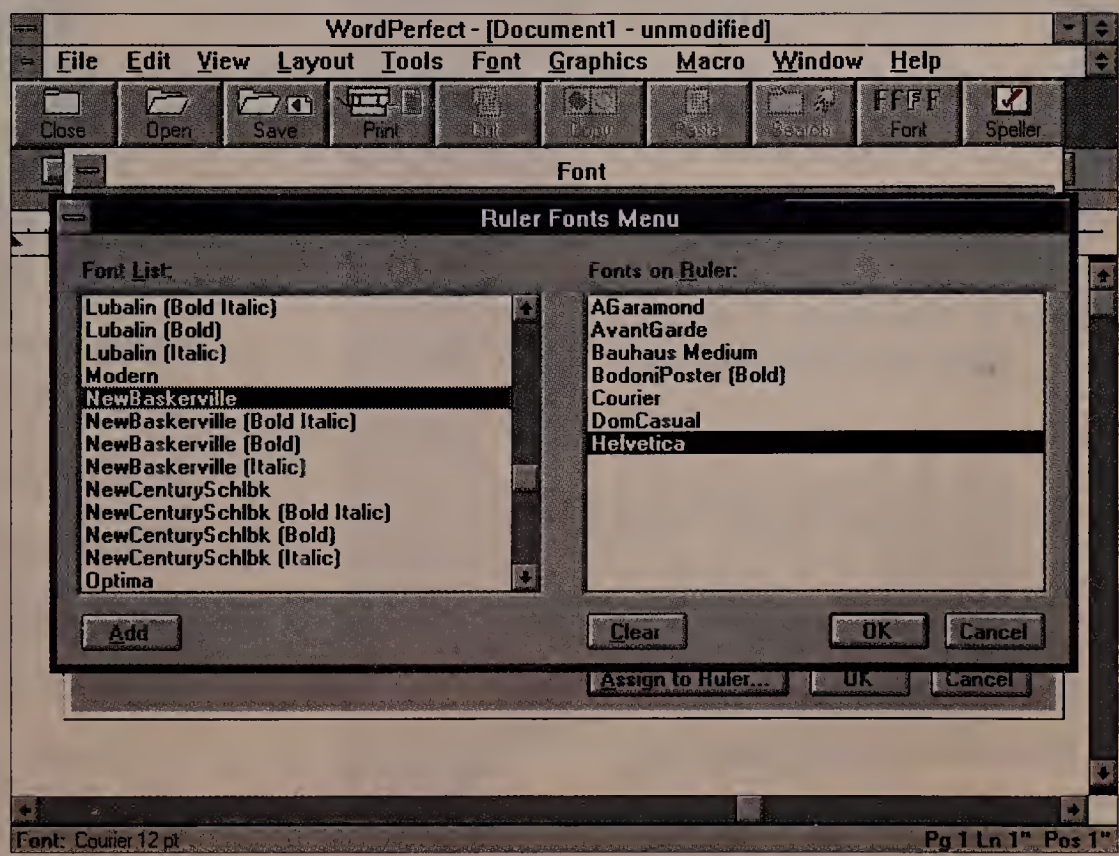
A. It's not you; it's *Windows*. Most of the editing tools you use in *Word for Windows* are part of *Windows* itself. In almost all *Windows* programs, what you type replaces any text you've already selected. Sometimes that's not what you expect.

Fortunately, Microsoft anticipated the dilemma that you describe in all its versions of *WinWord*. To turn off this feature, first start *WinWord*, and then select *Tools • Options*. Click on the *General* icon in the *Category* box, then click the *Typing Replaces Selection* checkbox to remove its 'X'. Click *OK* to finish the job, and from now on, what you type will appear to the left of text that you have previously selected.

Q. *I'm making the switch from* WordPerfect 5.1 *to* WordPerfect for Windows. *While I like the new program, there is something I don't understand. If I click the Font button on the ruler, all I see is 'Courier'. On the other hand, the Font command in the menu shows all my fonts. Is there a way to change the font list on the ruler?*

H. J. ROMA
SAN LUIS OBISPO, CALIFORNIA

A. The ruler's Font button contains a user-created list of fonts selected from the main font list. This gives you fast access to the fonts you use most often. But you have to add the fonts to the button yourself.



If you need quick access to fonts, use the Font button on WordPerfect for Windows' ruler to add the fonts that you use most frequently.

ANTHONY RUSSO

Start by double-clicking on the ruler's Font button. You'll see the main font selection dialog box. Click the *Assign to Ruler* button. In the next dialog box, click on a font in the font list to the left, then click the *Add* button to send it to the list on the right. Repeat this for your favorite fonts. Click *OK* twice to finish the job and return to editing. Your altered list becomes the new default.

Q. *I recently switched to* Ami Pro *and love it. But I have just spent an hour trying to delete a page that has nothing on it. I didn't insert a page break, so I can't figure out why the program shows an extra page. It's a waste of paper and time to print a blank page. Can you help me find a way around this obstacle?*

STEVE HILL
NANUET, NEW YORK

A. I encountered the same annoying problem but finally found a solution. To understand the remedy, though, you need to understand the cause. If you have a single page or the last page of the document on screen and then press **<Page Down>** or click the Page Down arrow at the bottom of the screen, *Ami Pro* creates a blank page, then jumps to it. That blank page becomes part of the document.

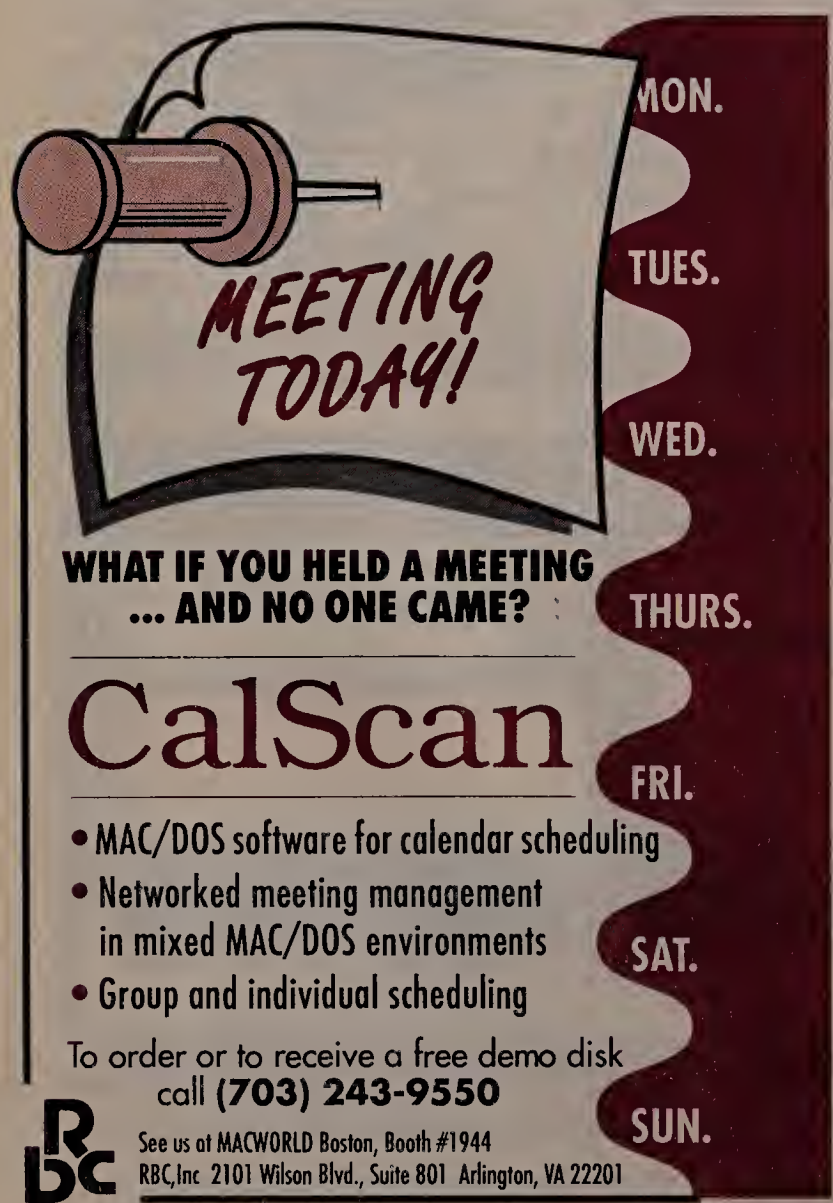
Fortunately, the solution is simple. Load the offending document, then use **<Page Down>** to go to the blank page. Click once on the page and delete any stray blank lines, another possible cause of your problem. Then press **<Backspace>** once to delete the blank page. Be sure to save the file once you have removed the page.

Correction

In the March *Word Processing Clinic*, an error crept into the answer to Marianne V. Shackles' question about changing the capitalization of a *WordPerfect* data file. Step 4 in the second set of instructions (the section beginning "To use the macro") says to press <Enter> after typing in the word count. If you do this, you'll change the capitalization in one word only. To capitalize the first letter of each word in your data file, you should skip directly to step 5 after typing in the word count, *without* pressing <Enter>. *PC World* regrets the error.

Mail your word processing questions to Word Processing Clinic, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Word Processing Clinic; George Campbell, CompuServe, 71571,222; MCI Mail, GCAMPBELL; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

George Campbell is a contributing editor for PC World.



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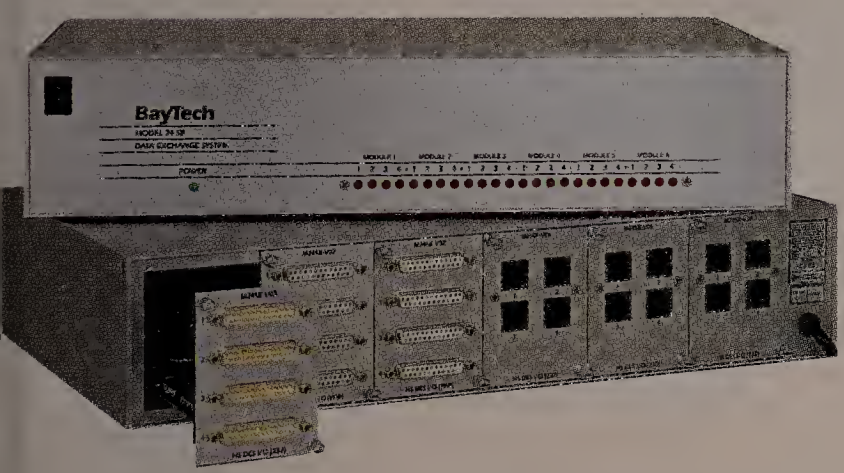

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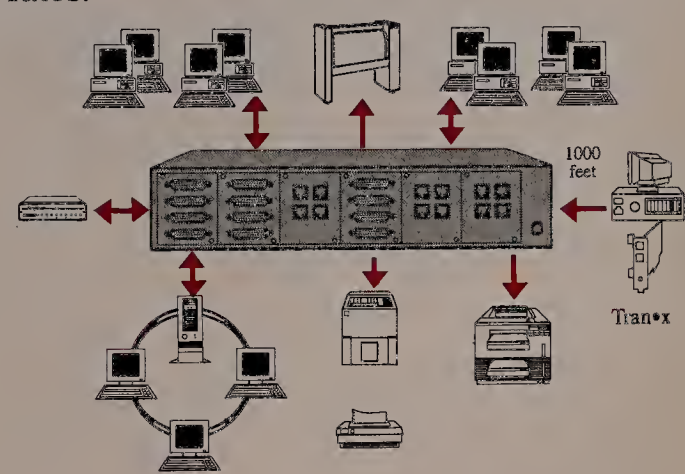

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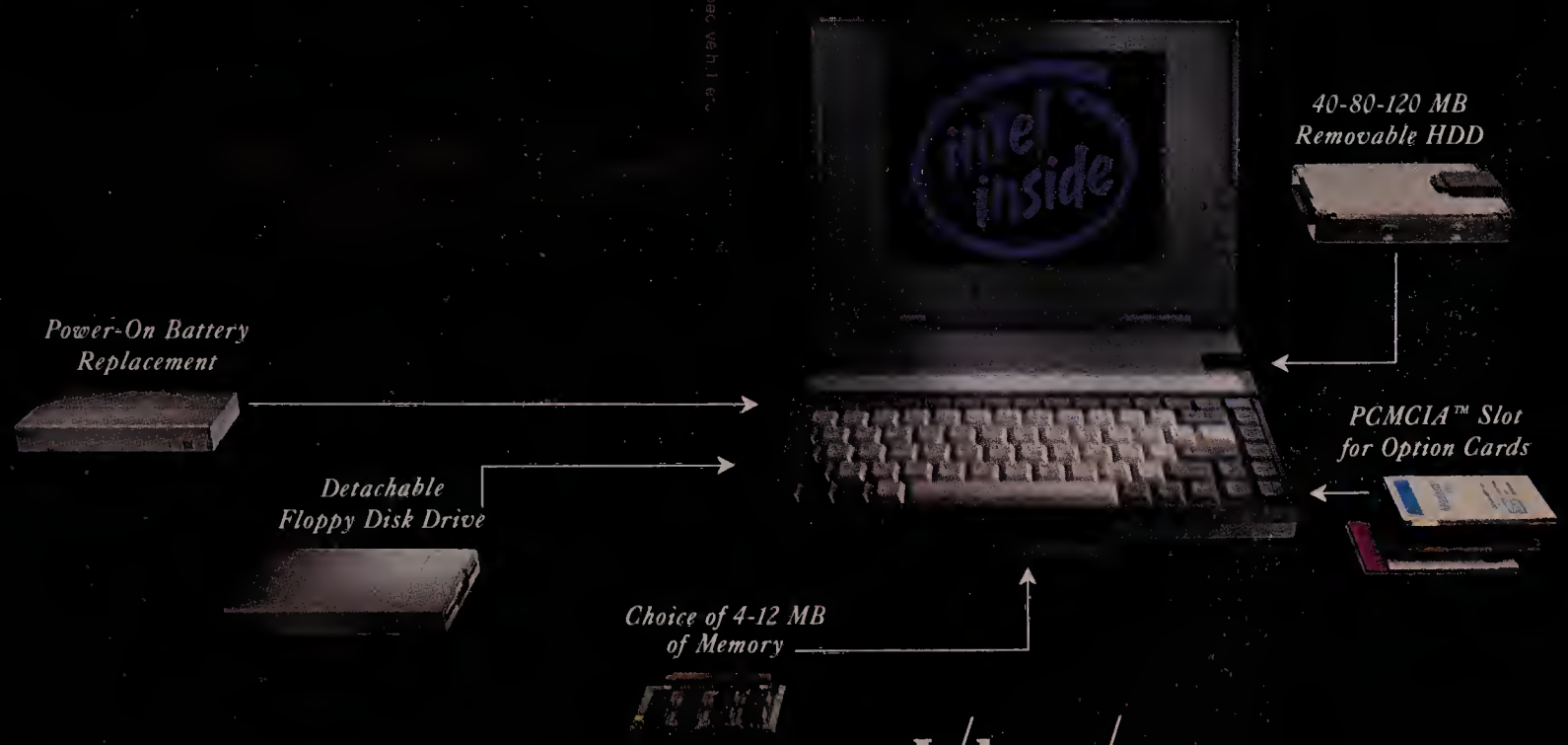

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DATA BASICS

BY CELESTE ROBINSON

Tips and techniques for managing your data

Q. *The record number is an important part of our* dBASE III Plus *data base. Consequently, we don't use the PACK command to remove "deleted" records, because that would change the record numbers throughout the file. To keep file size down, we'd like to reuse the deleted records when we input new data, but these records are scattered throughout the file. Is there a simple way to put the deleted records where we can find them easily?*

D. J. LONGHINI
MILWAUKEE, WISCONSIN

A. When you tell *dBASE* to delete a record, the program merely marks the record for deletion; it's not actually erased until you issue a PACK command. Whether you're using *dBASE III Plus*, *dBASE IV*, or a compatible program such as *FoxPro*, you can bring all your deleted records together with an index. At the dot prompt, enter **INDEX ON IIF(DELETED(),0,1) TO** *filename*, where *filename* is a name for the index file you're about to create. As long as you are viewing the data base with this index active, deleted records will always appear on top.

Q. *I'm keeping track of my bills using* R:base. *Is there an easy way for me to copy all the bills from one month to another, changing the date values as I do so? It would save me a lot of data-entry time if I didn't have to keep typing the same names and amounts in each month.*

DOMINIQUE GEORGES
SANTA MONICA, CALIFORNIA

A. Doing what you want will take several steps, but unless you are lucky enough to have few monthly bills, it will be a lot easier than typing the bills in every month. The process involves creating a new table with the records you want to copy, updating this new table, and adding the result to your main bills table.

First you need to copy one month's bills to a new table. With the data base containing your bills table active (let's assume the table is called Bills), choose *Info • bills* from the main menu. Once the Bills data is displayed, press **<Ctrl>-<F3>** to bring up the query-design screen. Move the cursor to the date field, type **between 6/1/92 and 6/30/92** (or whatever the start and end dates are for the month you want to copy), and press **<Enter>** and **<F2>** to display the results of your query. To save these results in a new table, select *Query • Save answer*, enter a new table name, such as **Billcopy**, and press **<Enter>**. *R:base* will display the new table.

The next step, changing the dates on the records in Billcopy, can be done only from the R> prompt. To get there from the query screen, select *Exit • Exit • R> prompt*. At the R> prompt, type **UPDATE BILLCOPY SET** *datefield* **TO** *datefield* **+ 30**, where *datefield* is the date field you need to update, and press **<Enter>**.

Reader Tip

CHECK BEFORE DELETING PARADOX RECORDS

There's nothing worse then pressing **<Delete>** and seeing a whole record disappear. Here's a way to tell *Paradox* to prompt you before it deep-sixes information.

First, create an ASCII text file in your PARADOX subdirectory called **DELTRAP.SC**:

```
IF NOT ISFIELDVIEW()
THEN SHOWMENU
"Cancel" : "Keep this record",
"Delete" : "Delete this record"
TO choice
IF choice = "Delete"
THEN DEL
ELSE DEL
ENDIF
```

Next, add a line to your INIT.SC file (create one if you don't already have it) that reads **SETKEY "Del" PLAY "***path***\\DelTrap"**, where *path* is like the path to your PARADOX directory, except it has double backslashes (\\) instead of single ones; for instance, use **C:\\PDOX35** rather than *C:\PDOX35*. After you reenter *Paradox*, you'll have no more unpleasant surprises when you press <Delete>.

LAUREN LEE
NEW YORK

R:base will prompt you to press <Enter> again before it changes Billcopy's date values. Once the update is complete, type MENU and press <Enter> to return to the main menu.

To finish the process, you must copy the updated records from Billcopy to the Bills table. Select *Tools • Relational tools • Insert • billcopy* and, after the list of fields from Billcopy is shown, press <Shift>-<F6> to checkmark all the entries in the box. Next, press <F2> for a list of tables, select *bills*, press <Shift>-<F6> to checkmark all the fields again, and press <F2>. You'll see one more dialog box—simply press <F2> to accept the defaults. *R:base* will then copy the new records into Bills.

Q. *How can I list all the records in one* Paradox *table that aren't repeated in another table? For example, I occasionally have to update my sales lead table with information from other files, and I'd like an easy way to view only those names that aren't listed in the master table.*

STEVE JACKSON
REDDING, PENNSYLVANIA

A. By comparing the contents of a field in one table with a similar field in another, a SET query can be made to do exactly what you want. Say you have a primary table of sales leads, called LEADS, with a field called Phone #, and you're confident that no two records have the same phone number. You also have a second table called NEWLEADS, which includes a field—also unique—called Phone. You can use a *no* SET query to find the names in NEWLEADS with phone numbers not listed in LEADS.

First, choose *Ask* from the *Paradox* main menu, and enter LEADS when prompted for a table name. Type SET in the leftmost column of the resulting query image, under the table name LEADS. <Tab> the cursor to the Phone # field, press <F5>, and enter A as an example element. To bring the other table into the query, press <F10>, select *Ask*, and enter NEWLEADS for the query table. Use <Tab> and <F6> to checkmark the fields you want in your Answer table (do *not* check Phone). With the cursor in the Phone field, type NO, press <F5>, and type A again. Press F2 to see all the records in Newleads that don't have matching phone numbers in Leads.

Mail your questions and tips to Data Basics, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Data Basics; CompuServe, 74055,412; MCI Mail, 179-3813; or 415/442-1891 (fax).* PC World *pays $50 for published questions and tips. Sorry, we cannot acknowledge unpublished materials.*

Celeste Robinson is an information systems consultant and the author of several data base how-to books.

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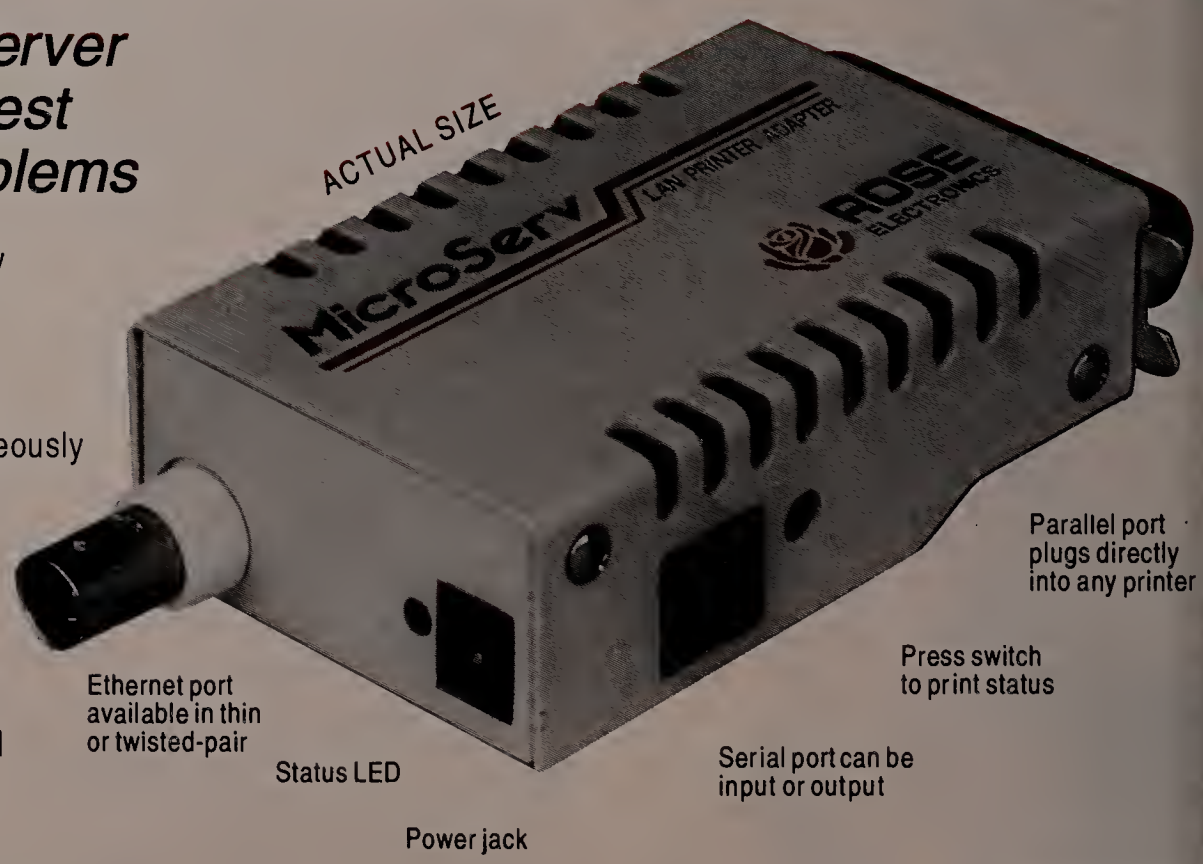

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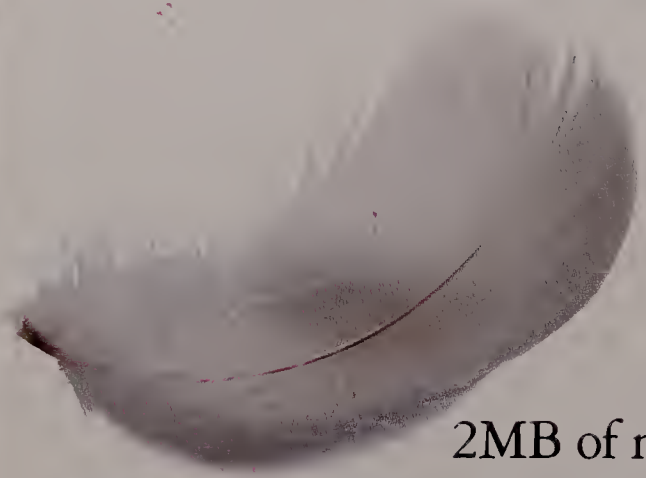

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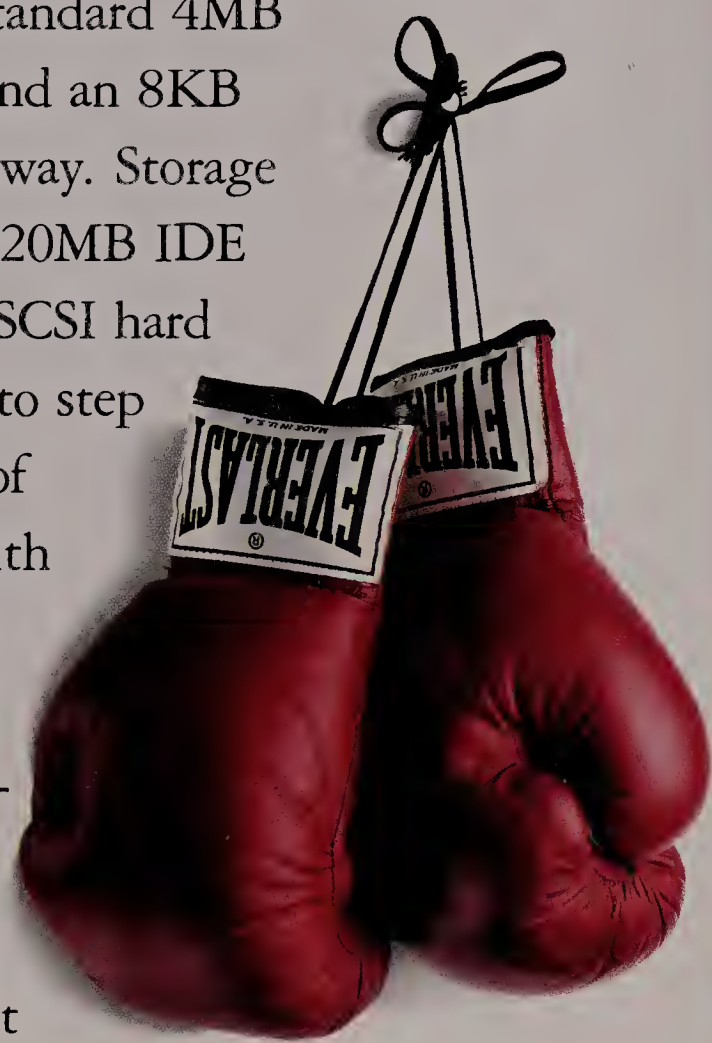

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How many applications will your PC(s) run in a typical workday? _____

What best describes the type of work the system will be used for? (Check all that apply)

☐ Word Processing	☐ Desktop Publishing	☐ Scientific Research
☐ Order-entry	☐ Education	☐ Software Development
☐ Database (filing records)	☐ Design (CAD/CAM)	☐ E-Mail
☐ Financial Calculations	☐ Engineering	☐ Other industry-specific applications (please specify)
☐ Retail Store Management	☐ Industrial Process Control	

How many people work in your group, department or small business?
☐ Less than 10 ☐ 10-20 ☐ 20-35 ☐ More

Is your operating system:
☐ DOS ☐ DOS with Windows ☐ OS/2 ☐ MAC ☐ UNIX™ ☐ Other

Which of the following graphics-oriented applications best describes your needs? (Check all that apply)

☐ Desktop Publishing	☐ Realtime Modeling	☐ AutoCad
☐ CAD/CAM	☐ Animation	☐ Business Graphics
	☐ Image Processing	

LAN Communication

How many PCs do you have installed? _____ From how many manufacturers? _____

What kinds of connections does your PC(s) require? (Check all that apply)

- ☐ Links with other PCs in the immediate surroundings
- ☐ Connection to the local area network (LAN) throughout a building
- ☐ A line to a host system in a remote location

What kind of media (cable) is used in your LANs today? _____

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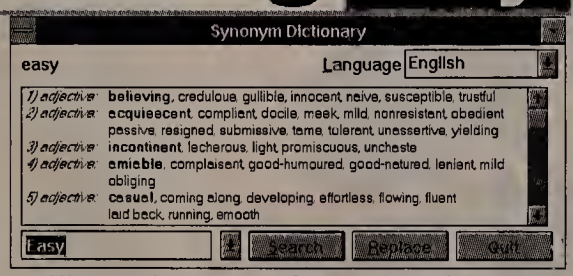

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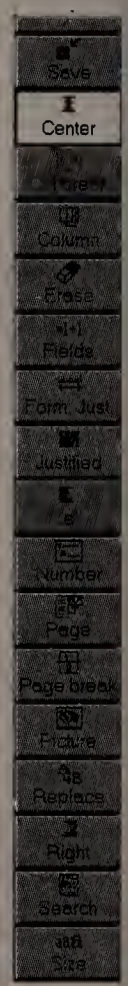

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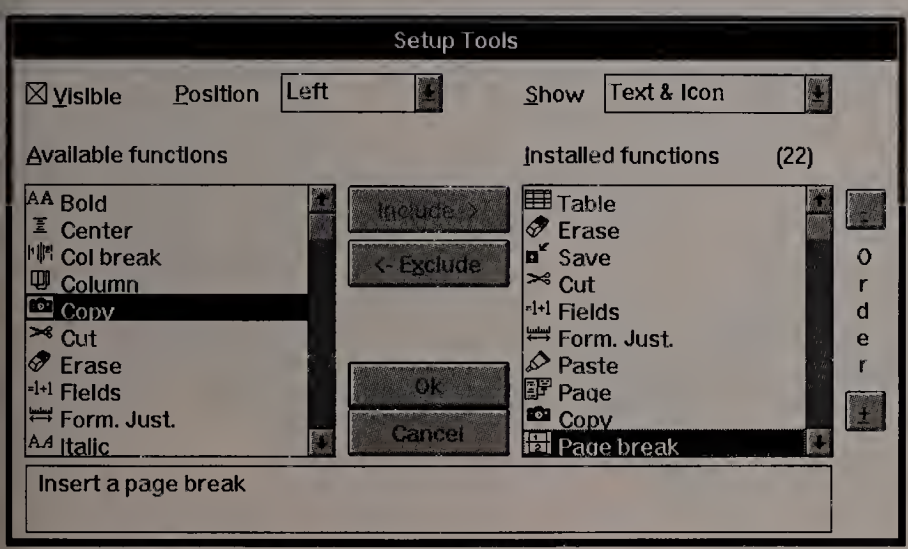

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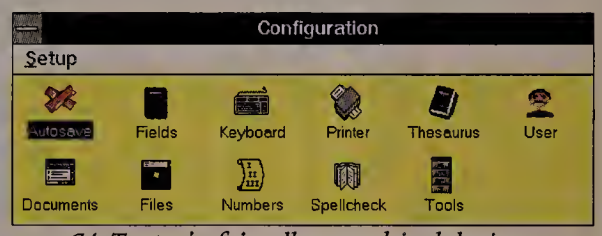

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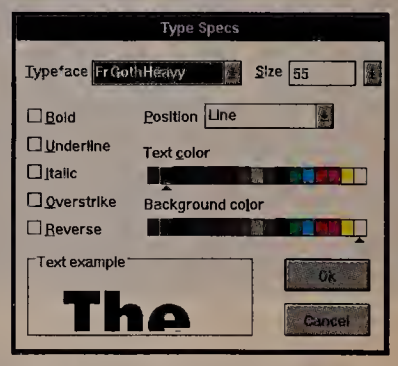

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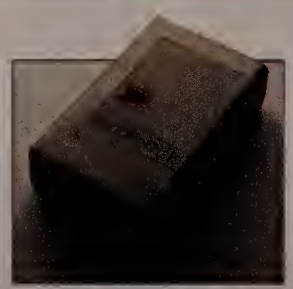

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Which articles in *PC World* are valuable to you? Which aren't? Help us improve *PC World* by taking a few minutes to fill out the questionnaire below. Fax in your response and you'll have a chance to win the NEC Intersect CDR-73M, Best Buy in our May CD ROM drive roundup.

HERE'S HOW IT WORKS: Please read or look through the magazine as you normally would. (If you normally look through it several times, do the same this time.) Then fill out the questionnaire below, indicating which articles you read and how valuable their content was to you. Please also take a moment to tell us what you would like to see in future issues.

HERE'S HOW YOU ENTER: Fax your completed questionnaire, along with your name, address, and phone number, to *PC World* at 415/267-1779. If you do not have a fax machine, you can mail your survey to Fax Survey, *PC World*, 501 Second St. #600, San Francisco, CA 94107. Send your survey in no later than June 15; we'll notify the winner by the end of June.

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TO FILL OUT THE FORM: Photocopy this page and fill out the questionnaire using black pen. Fill in the circles under the answers that apply to each article you read. First tell us whether you read the entire article or just some of it. If you didn't read it at all, leave the line blank. If you read the article, please rate its value to you on a scale from 1 (least valuable) to 5 (most valuable). WHEN FILLING IN THE CIRCLES, AVOID GOING OUTSIDE THE LINES!

	Did you read it?		Value to you? (Least 1 – Most 5)				
	All	Some	1	2	3	4	5
Sample	◉	○	○	○	○	○	◉
In This Issue (page 13)	○	○	○	○	○	○	○
Letters (page 17)	○	○	○	○	○	○	○
What Next? (page 47)	○	○	○	○	○	○	○
Top of the News (page 50)	○	○	○	○	○	○	○
New ASTs Deliver Premium Power (page 52)	○	○	○	○	○	○	○
1-2-3 2.4 Gains Add-In Attractions (page 54)	○	○	○	○	○	○	○
Dell's Graphics Go Direct (page 55)	○	○	○	○	○	○	○
An On-Line Window: Procomm Plus (page 56)	○	○	○	○	○	○	○
Norton Does a Desktop for DOS (page 60)	○	○	○	○	○	○	○
New Products (page 65)	○	○	○	○	○	○	○
Industry Outlook (page 109)	○	○	○	○	○	○	○
PC World Marketplace (page 116)	○	○	○	○	○	○	○
33-MHz 486s: Hot Commodities (page 120)	○	○	○	○	○	○	○
Peer-to-Peer LANs (page 174)	○	○	○	○	○	○	○

	Did you read it?		Value to you? (Least 1 – Most 5)				
	All	Some	1	2	3	4	5
OS/2 2.0 Challenges Windows 3.1 (page 192)	○	○	○	○	○	○	○
50 Spreadsheet Tips (page 196)	○	○	○	○	○	○	○
Buyers' Guide: High-Speed Modems (page 220)	○	○	○	○	○	○	○
Spreadsheets: The Next Generation (page 232)	○	○	○	○	○	○	○
Buyers' Guide: Dot Matrix Printers (page 244)	○	○	○	○	○	○	○
The Help Screen (page 253)	○	○	○	○	○	○	○
Word Processing Clinic (page 267)	○	○	○	○	○	○	○
Data Basics (page 273)	○	○	○	○	○	○	○
Publishing & Presentations (page 286)	○	○	○	○	○	○	○
Communications Q&A (page 289)	○	○	○	○	○	○	○
Windows Workshop (page 291)	○	○	○	○	○	○	○
User Group Tips (page 295)	○	○	○	○	○	○	○
Star-Dot-Star (page 303)	○	○	○	○	○	○	○
Instant Reference Card: Windows 3.1 (page 307)	○	○	○	○	○	○	○
The Home Office (page 342)	○	○	○	○	○	○	○

What would you like to see covered in future issues?

○ Processor upgrades ○ Laptops/notebooks ○ Hard disks/controllers ○ Analysis tools ○ Other (specify) _____

○ 80386 DX/SX PCs ○ Motherboards ○ DOS applications ○ Project management apps _____

○ 80486 DX/SX PCs ○ Video cards ○ Windows applications ○ Personal information managers _____

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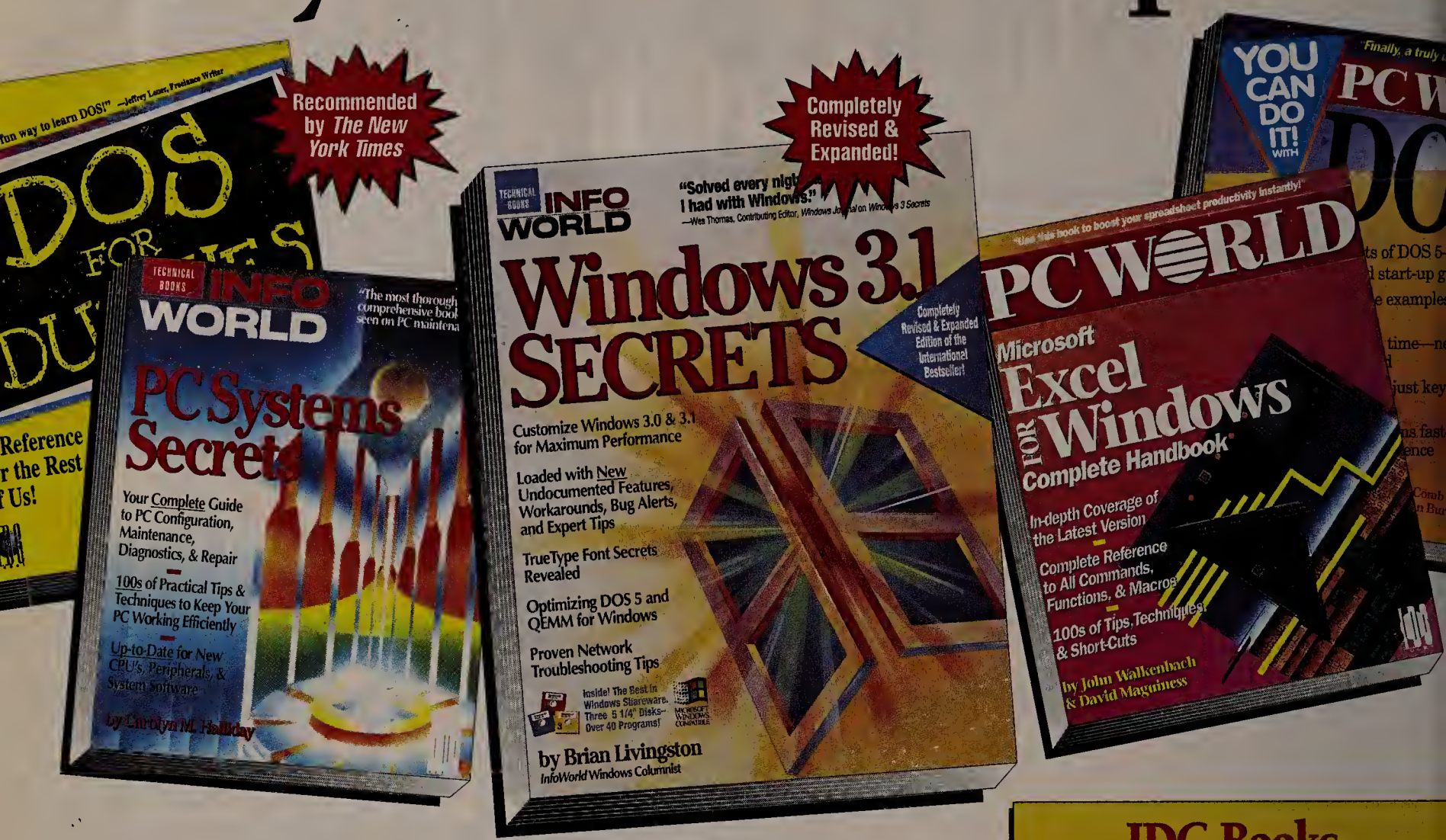

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Expert advice for creating high-impact documents and presentations

Newsletters face an uphill fight for attention in the business world, because they compete with direct mail, advertisements, magazines, memos, and other communications. To stand out and deliver vital information effectively to readers, a newsletter must convey uniqueness, immediacy, and newsworthiness at a glance.

With these goals in mind, we chose a 10-page monthly newsletter from the National Automated Clearing House Association as this month's make-over document. The *Automated Payments Update,* distributed to more than 3500 bankers and financial executives, provides important news in the fast-paced electronic payments industry.

The main problem with *Update* is that it looks like a hundred other bland, text-intensive newsletters, with a stodgy format that belies the timeliness of its contents. Worse, you must flip through the entire issue to find out what's in it.

In our redesign, we enlivened the newsletter's format by creating a more dynamic nameplate, or banner, and by changing from two- to four-column format. The original nameplate contains two boxed elements—the newsletter's title and its slogan—which compete for attention and diminish one another's effect. To make the nameplate more compelling, we removed the slogan and emphasized the word most likely to attract readers: *Update.* To underscore the publication's relevance to the banking industry, where rubber stamps are ubiquitous, we gave the word *Update* a stamped look by placing it in a box at an angle.

The new four-column format lends the publication the look of a daily newspaper and cuts the number of characters per line, making the text easier to read. With more than two columns, it's easier to start a second article on the first page. Adding a contents box helps busy readers quickly locate other items of interest.

Finally, we rewrote the headlines, which were long and unwieldy. A succinct headline with ample white space is usually more effective than a lengthy, crowded one. We used shorter headlines and turned the originals into decks—phrases that provide more information about the article at its outset.

With a revamped nameplate and more places for readers to start exploring the newsletter, the redesigned *Update* has multiplied its chances of hooking the reader.

Mail your business document and presentation make-over candidates, preferably clean and unfolded, to Publishing & Presentations, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to Richard Jantz, PC World Online, Publishing & Presentations; 415/442-1891 (fax). We pay $200 for each published redesign submission. Sorry, we cannot acknowledge unpublished materials.* ●

Contributing Editor Richard Jantz is a computer publishing consultant in Berkeley, California. Larry Westdal, a graphic designer with Westdal Design Associates in Berkeley, also contributed to this article.

1 To strengthen the publication's nameplate and identity, we changed the title's typeface from the scholarly serif Palatino to Corel Draw's more dynamic sans serif Switzerland Inserat.

2 Using Corel Draw, we created the rotated type and rounded rectangle and saved the image as an Encapsulated PostScript file. We imported the EPS file into our page layout program and printed it in spot color (green) to give it a stamp-like, hot-off-the-press look.

3 The old headline, set in 18-point Times Bold, is long and crowded. A shorter headline, set in 30-point Helvetica Bold, is easier to grasp at a glance and provides more eye-pleasing contrast and white space. The original headline has become a deck, set in 12-point Helvetica Condensed Bold Italic with a ½-point rule below.

4 A contents box helps draw readers inside the newsletter. The box includes a solid color bar, with white type set in 12-point Helvetica Bold caps, a 1-point rule around the box, and a 10 percent background screen. Content titles are set in 10-point Helvetica Bold.

5 Starting a second article on the first page offers readers another invitation to delve into the newsletter. A 1-point rule separates the main article from the second, which takes a 20-point Helvetica Bold headline.

6 A four-column format makes the document look more newspaperlike than the original two columns did, and it provides more flexibility in laying out graphics.

ANTHONY RUSSO

AFTER

AUTOMATED PAYMENTS UPDATE

National Automated Clearing House Association
News That Impacts the ACH Network

Volume 6 Number 10
October 1991

Cutting Your Losses

ACH Death Notices Could Slay Costly Reclamation Process

The Social Security Administration has proposed an "ACH death alert" plan that could benefit its trust fund balances and cut the estimated $7 million to $27 million that ACH participants lose each year when pensions and other benefits payments are sent to deceased recipients' accounts.

An idea to use the ACH to send death notifications to financial institutions arose after a 10-state pilot program sponsored by SSA showed that electronic notices can help the government eliminate some reclamations and allow it and other benefits distributors to retrieve payments made to deceased recipients more quickly. The messages also would cut financial institution losses.

Originators and receivers of benefits payments via the ACH lose up to $27.3 million each year when people who share accounts with deceased recipients withdraw deposits made to the dead person. SSA wants to implement a program that would notify financial institutions that recipients who have died may still be receiving payments. The financial institution could then "flag" the account and expedite the return of payments made to deceased account holders. A death alert system would benefit SSA and other benefits distributors by allowing them to retrieve returned funds faster and more efficiently.

Due to SSA's processing schedule, a social security recipient who dies during the last eight business days of the month will still be sent a benefit payment for the following month. When these payments are withdrawn by the husband, wife or other person sharing an account with the deceased recipient, the receiving bank is forced to return the funds to the federal government or other payor.

SSA took additional interest in a death alert program because it originates payments to a large segment of the population that dies each year. About 900,000 social security beneficiaries who receive direct deposit die each year, said Mike Johnson, director of SSA's payment and recovery policy staff. Out of that number, approximately 345,000 die during the last eight business days of the month, resulting in a total of $196 million in erroneous payments annually. Because a majority of beneficiaries who die have a joint account, the possibility that the SSA will have to reclaim lost funds from a financial institution is high.

Any organization sending benefit payments would profit from the death notification plan, Johnson said. The funds could be returned without the need to keep detailed death records or send reclamation notices.

(see LOSSES, page 4)

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New Reverse Prenotes Rollout

Reverse Prenotes Increase Direct Deposit Enrollments

The Financial Management Service is preparing a national rollout of its "Automated Direct Deposit Enrollments by Reverse Prenote" pilot. Phase one of the program, in which 25 financial institutions transmitted reverse prenote enrollments, was completed earlier this year. Preliminary reports show that more than 35,000 social security benefits recipients have been enrolled via this mechanism.

The FMS received case studies from participating financial institutions and has published the results. Comments from the participants indicate strong support for the reverse prenote concept.

In a joint effort, the FMS and the Social Security Administration are planning a controlled expansion of the reverse prenote feasibility study. Slated for late 1991, an additional 100 financial institutions will be added to the system as technological capabilities are developed. The new participants will be selected through regional ACH associations throughout the country.

The SSA reports that more than 50 percent of its 43 million social security beneficiaries use direct deposit. In addition, the government predicts that by the year 2020,

(see PRENOTES, page 5)

BEFORE

AUTOMATED PAYMENTS
News That Impacts The ACH N
National Automated Clearing House Association

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"If you're a pensi
pension every month and
to tell you that the recipie
For pension and other ben
initiated death notification
months after the death or
information about benefits
Puerto Rico and Washingt
for most businesses.

"You have to inv
on people," Johnson said.

Insurance compan
to rely on family reports o
records. Payors initiating

The Social Security Administration, as the largest government entity disbursing benefits, has a vested interest in knowing who's alive and who's dead.

have spent millions of dollars in time and money trying to track down death certificates. And with more than 20 million direct deposit payments to social security recipients each month, SSA had a good reason to look for a better way of discovering which of its payees had died.

"The Social Security Administration, as the largest government entity disbursing benefits, has a vested interest in knowing who's alive and who's dead," Johnson said.

So SSA decided to look for sources of death information. Other government groups kept some computer databases that included death records, but none reported all deaths in all states. SSA found its solution in a program that state government offices undertook during the 1970s. Nearly 20 years ago, state vital statistics offices began automating their death records. By using automation technology in its pilot program during the 1980s, SSA found out it could use

See DEATH NOTICE, page 5

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Winter Issue — Volume 8, Number 2

A Travel Plus Publication

Gateways

INSIGHTS FOR THE BUSINESS TRAVELER

Three Great Places to Mix Business with Pleasure

If business is taking you on the road soon, why not extend your trip into a memorable vacation? Three exciting American cities, Boston, Chicago, and San Francisco, are luring increasing numbers of business travelers, and provide plenty of sights, sounds, and flavors to satisfy even the most demanding vacationer.

* * * * *

Too often, business "travel" limits one to a view of the hotel and convention hall, [illegible]uch else. Here's [illegible]een missing all what you may have [illegible] these years.

[illegible] offers many rewards to those who take the time to uncover its cornucopia of riches.

For an interesting lesson in American history, don your walking shoes and follow the Freedom Trail (536-4100). The trail's two loops will lead you past no fewer than 16 historical sites, including the Old North Church, the location of the Boston Massacre, the Granary Burial Ground, the Old Corner Bookstore, Paul Revere's House, and the Old South Meeting House.

Beantown contains far too many historical gems to mention here, but make an effort to visit the Boston Tea Party Ship and Museum in southern Boston (338-1773), the John F. Kennedy Presidential Library (929-4523) in Dorchester, the Bunker Hill Monument in Monument Square (Charlestown, 242-5641), and "Old Ironsides" (426-1812, also in Charlestown).

(continued on page 4)

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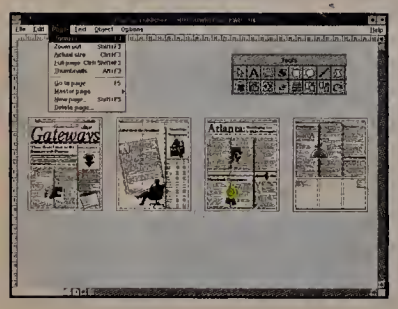

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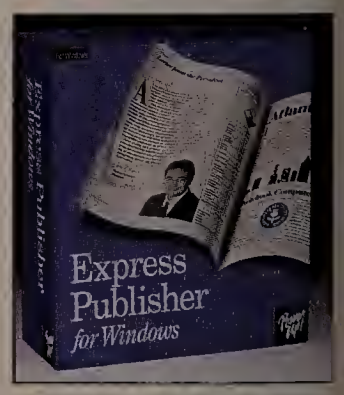

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COMMUNICATIONS Q&A

BY JUDY HEIM

On-line resources for business and professional users

Q. *Our department is moving to a LAN with an ethernet connection to a mainframe. To access the network and its mainframe, I need software that understands TCP/IP network protocol. I've become addicted to* Crosstalk for Windows, *which is much easier to use than any TCP/IP software I've seen. Is there any way to get* Crosstalk for Windows *to speak to the network?*

WILLARD URBAN
DURHAM, NEW HAMPSHIRE

A. Yes, there is. *Crosstalk for Windows 1.2* supports what's known as the Interrupt 14 Applications Programming Interface standard. This means if your TCP/IP network software offers an Interrupt 14 redirector, you should be able to make your LAN interface appear to *Crosstalk* as a serial port. Ask your network software vendor how to go about doing this.

If your TCP/IP software doesn't offer this important feature, consider switching to a software package that does. A good choice is *Super-TCP for Windows.* Setting it up is a breeze. When you install the program, as a *Windows* driver, you tell it which communications port it should emulate.

Super-TCP for Windows is available for $495 from Frontier Technologies Corporation, 10201 N. Port Washington Rd., Mequon, WI 53092; 414/241-4555, 414/241-7084 (fax).

Q. *I enjoy browsing through CompuServe Special Interest Groups (SIGs), but having to press <Enter> after every message is irritating and increases my on-line charges. Is there a way to scroll through messages on CompuServe without having to hit a carriage return after each one?*

LINCOLN RODRIGUEZ
AUSTIN, TEXAS

A. CompuServe offers single-keystroke commands to control scrolling, but the commands are neither intuitive nor easy to find. (You'd think this company charges by the minute!) The first time you're prompted for a carriage return, type **S** before you press **<Enter>**. The messages will scroll up without stopping. If you want to pause the display, press **<Ctrl>-A**; to resume, press **<Ctrl>-Q**.

Q. *I'd like to tap some of the major data base services for information, but I'm afraid of wasting money on line, trying to find what I need. Will any of the services search for me, then mail or fax the results for a flat fee?*

ANTHONY TOMPKINS
FORT LAUDERDALE, FLORIDA

A. Information services are finally acknowledging that some people don't want to spend an afternoon on a $100-an-hour data base. Almost all the major services now offer some sort of on-line search for customers who'd rather get their information by fax than go on line and choke it out of a data base. The fees are anything but flat; they're usually based on how much information you want from how many sources, and the costs add up. But at least you're not paying for every minute you spend on line reading menus. If you're worried about costs, you may want to consider hiring an information broker (see *Communications Q&A,* October 1991) before using one of the following services:

Dow Jones News/Retrieval offers a newspaperlike clipping service, Facts Delivered, which will monitor any of 500 available magazines and newspapers according to a search profile you set up. They then deliver the results to you by fax or E-mail. The service costs $15 a month, plus $1.50 for each half-page delivered. This can turn into quite a bit of money, but the news is timely and definitely pinstripe.

Mead Data's Nexis Express will search Nexis's vast periodical collections—mostly banking, energy, technology, and marketing publications—as well as its collection of regional business magazines. Unfortunately, its law and medical data bases aren't included. Searching is pricey at $180 for half an hour, plus a 4- to 8-cents-per-line printing charge and 25 cents a page for fax delivery.

Dow Jones News/Retrieval Facts Delivered, 800/445-9454 ext. 2267; Nexis Express, 800/843-6476, 800/227-8379 ext. 5505 (in Ohio).

Mail your communications questions to Communications Q&A, PC World, *501 Second St. #600, San Francisco, CA 94107, or send them electronically to PC World Online, Communications Q&A; CompuServe, 75300,713; GEnie, JUDY.HEIM; MCI Mail, 312-7737; Internet, 3127737@mcimail.com; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

Judy Heim is a contributing editor for PC World.

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Timeframe	i486	i486SX	i386	i386SX	Notebook	Other
Less than 1 month						
1-3 months						
3-6 months						
6-12 months						
More than 12 months						

2. If you resell, please identify your primary customers:
☐ Education ☐ General Business ☐ Government ☐ Medical
3. By which method do you acquire PCs?
☐ Mfg rep calls on me directly ☐ Local retailer
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4. From whom do you currently purchase PCs? _____
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Fax Number: (_____) _____

1. Which products are you most interested in, and how many do you plan to purchase in the next 12 months?

Timeframe	i486	i486SX	i386	i386SX	Notebook	Other
Less than 1 month						
1-3 months						
3-6 months						
6-12 months						
More than 12 months						

2. If you resell, please identify your primary customers:
☐ Education ☐ General Business ☐ Government ☐ Medical
3. By which method do you acquire PCs?
☐ Mfg rep calls on me directly ☐ Local retailer
☐ VAR/Integrator ☐ Mail order/direct
4. From whom do you currently purchase PCs? _____
5. Are you interested in leasing? ( ) Yes ( ) No

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WINDOWS WORKSHOP

BY SCOTT DUNN

Practical answers to your questions about Windows

Q. *How can I change the name of the directory in which* Windows *is located? I would like to rename it WIN to make more room on my AUTOEXEC.BAT's PATH command.*

G. SRINIVASAN
CHICAGO

A. Since PATH statements are limited to 127 characters, it's a good idea to shorten directory names—especially if you're on a network, which can really pad your PATH. As long as you're making the effort, though, you might as well free two more characters and rename your *Windows* directory **\W**. The operation can be simple or painful, depending on how many applications you have that expect *Windows* to be in \WINDOWS. Here's the process:

1. Create your new \W directory (**MD \W**) and copy all your \WINDOWS files and subdirectories to it. The best way to do this is to type **XCOPY C:\WINDOWS C:\W /S**. (The /S is a switch that copies all your subdirectories and their contents.) Then back up and delete the contents of \WINDOWS and its subdirectories.

2. Using a text editor (preferably one that can search and replace), open your WIN.INI file and search for \WINDOWS. Replace every occurrence with \W. Repeat this step for every INI file. An easy way to do this is to use File Manager to search for *.INI, then double-click on each file to edit it in *Write*. (A few INI files, such as WINWORD.INI, are not ASCII files and cannot be edited.) Naturally, you'll also need to do this for your AUTOEXEC.BAT and CONFIG.SYS files as well as any batch files that look for \WINDOWS.

3. Reboot your computer and start *Windows* from its new directory. In Program Manager, you'll need to select each icon that has \WINDOWS specified in its properties command line. Choose *File • Properties* and change each command line to reflect the new directory.

4. Launch *Windows'* PIF Editor and edit any PIFs that refer to files in the former \WINDOWS directory.

Usually, this is all you need to do. You may have to reinstall a few of your *Windows* programs to inform them of the new directory.

Windows Toolbox

Looking for a Windows communication program with all the basics but not the high cost? Look no further than Unicom 3.0. Complete with a button bar and user-configurable function keys, Unicom supports a wide range of baud rates and gives you point-and-click access to on-line services including host mode, chat mode, dialing directory, and uploading and downloading files. All the popular transfer protocols are here, including ZMODEM and CompuServe B. The program also includes a respectable scripting language and the capability to record scripts automatically. This remarkably rich piece of shareware sells for $69.95 from Data Graphics, P.O. Box 58517, Renton, WA 98058; 206/432-1201, 206/432-8673 (fax); CompuServe 71631,464. Reader service no. 695.

Q. *Is there a way to print the contents of a PIF file?*

ROBERT L. SEYMOUR
SAN FRANCISCO

A. Yes, provided your printer can print graphics (which even many old dot matrix printers can do). Start *Windows'* PIF Editor and open the file you want to print. Press **<Alt>-<Print Screen>** to copy a picture of the PIF Editor window to the Clipboard. Then launch any *Windows* word processor. Position the cursor where you want the information to print and press **<Shift>-<Insert>** to paste the PIF Editor picture on the page. (If you also want the information from a 386-enhanced mode PIF, return to the PIF Editor, click *Advanced*, and repeat the above steps.) Finally, tell your word processor to print your page. With some programs, such as *Write*, you may have to enlarge the pictures for better legibility.

Q. *My disk drive is so full I find myself scavenging every square byte for files to delete. Aren't there some useless* Windows *files I can junk?*

DAVID GRENINGER
SEATTLE

A. Of course. You've probably already realized you can jettison *Windows* accessories and help files you don't use. Some likely candidates are CALC.EXE, CALC.HLP, CLOCK.EXE, CARDFILE.EXE, CARDFILE.HLP, CALENDAR.EXE, CALENDAR.HLP, PBRUSH.EXE, PBRUSH.HLP, RECORDER.EXE, RECORDER.HLP, RECORDER.DLL, TERMINAL.EXE, TERMINAL.HLP, WRITE.EXE, and WRITE.HLP. Though you shouldn't delete your PROGMAN. INI, PROGMAN.EXE, or PIFEDIT.EXE files, you can certainly live without both PROGMAN.HLP and PIFEDIT.HLP. In addition, you can remove all *Windows* wallpaper files (*.BMP), as well as games —REVERSI.EXE, REVERSI.HLP, SOL.EXE, and SOL.HLP, for example.

You may also have some unnecessary drivers from old printers or other devices still residing in you system; feel free to delete them. If you run *Windows* only in 386 enhanced mode, and never in standard mode, you can delete DOSX.EXE, KRNL286.EXE, and WINOLDAP.MOD without affecting your system. Remember, though, this will disable standard-mode *Windows*.

Feel free to zap any system enhancements that you don't use or that have been superseded by DOS 5.0 equivalents, such as EMM386.SYS, RAMDRIVE.SYS, or SMARTDRV.SYS. You can also print all the text files that come with *Windows* and expunge their electronic versions (*.TXT). Do the same for any WRI or DOC files that come with shareware.

Windows 3.1 has a utility that simplifies the process. In Program Manager, double-click on *Windows Setup* from the Main program group. Select *Options • Add • Remove Windows Components*. Follow the instructions in the resulting dialog box to delete unwanted README files, accessories, games, screen savers, and wallpapers.

Even after removing these components, it can still pay to jettison unnecessary drivers, fonts, and accessories that remain. And as with *3.0*, if you never run *Windows* in standard mode, in addition to removing the files mentioned in the above paragraph, you can delete DSWAP.EXE, WSWAP.EXE, and any file with a .2GR extension.

Removing fonts is another excellent way to shrink your *Windows* footprint. Delete all but the ones you use regularly.

Make sure your *Windows* temp directory is wiped out *after* you exit *Windows*. Normally, *Windows* does this for you, but if you crash or reboot without exiting, useless TMP files may linger. To fix that, add a line like **DEL C:\WINDOWS\TEMP*.TMP** to your AUTOEXEC.BAT.

Q. *I often refer to* Windows' *help when I have a question about a program. But the text it uses for cross-references and definitions appears in an annoying lime-green color on my monitor. I can hardly read it. I looked in the Control Panel but found no way to change this color. Is there a way?*

HAROLD S. BERGMAN
SIOUX CITY, IOWA

A. By editing your WIN.INI file, you can customize both "jump text" (which takes you to other entries) and "pop-up text" (which opens a definition window).

As with all WIN.INI editing, it's a good idea to first make a backup copy of the file. In Program Manager, select *File • Run* and type **SYSEDIT** to launch the System Configuration Editor. Click on the WIN.INI window to bring it to the front, and find the [Windows Help] section. (If no such section exists, just add it before any existing heading.) Under that heading, add the following lines:

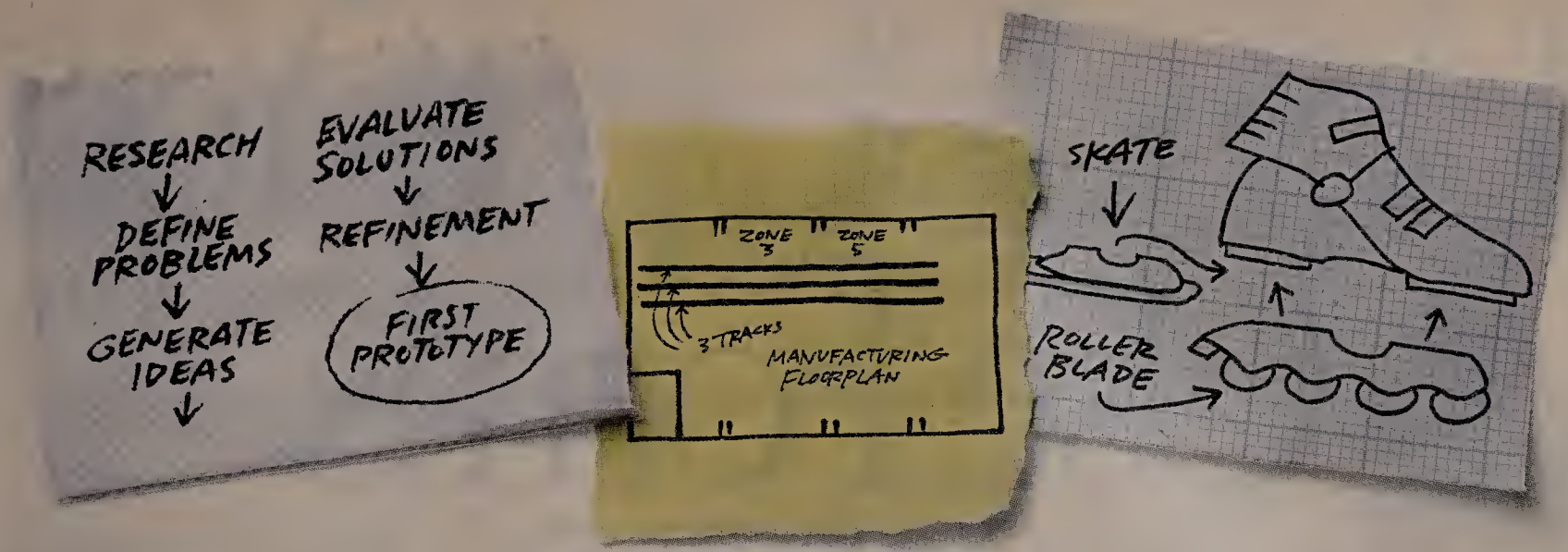
```
Jumpcolor=255 0 0
Popupcolor=0 0 255
```

The above example will make the jump text red and the pop-up text blue. You can adjust the colors by changing the three values in each line, which represent red, green, and blue, respectively.

Here's a quick way to determine the numerical value of the color you're looking for: Start Paintbrush and choose *Options • Edit Colors*. The resulting dialog box displays scroll bars, which show the numerical value of each color, and provides a preview window of the color. Adjust the scroll bars until you find a color you want, then copy the values into WIN.INI as explained above. Although *Windows* won't let you use dithered colors (mixed dots of different colors), it will adjust to the nearest solid color.

Mail your questions to Windows Workshop, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Windows Workshop; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

Scott Dunn is coauthor of 101 Windows Tips *(Peachpit Press, Berkeley, California, 1991).*



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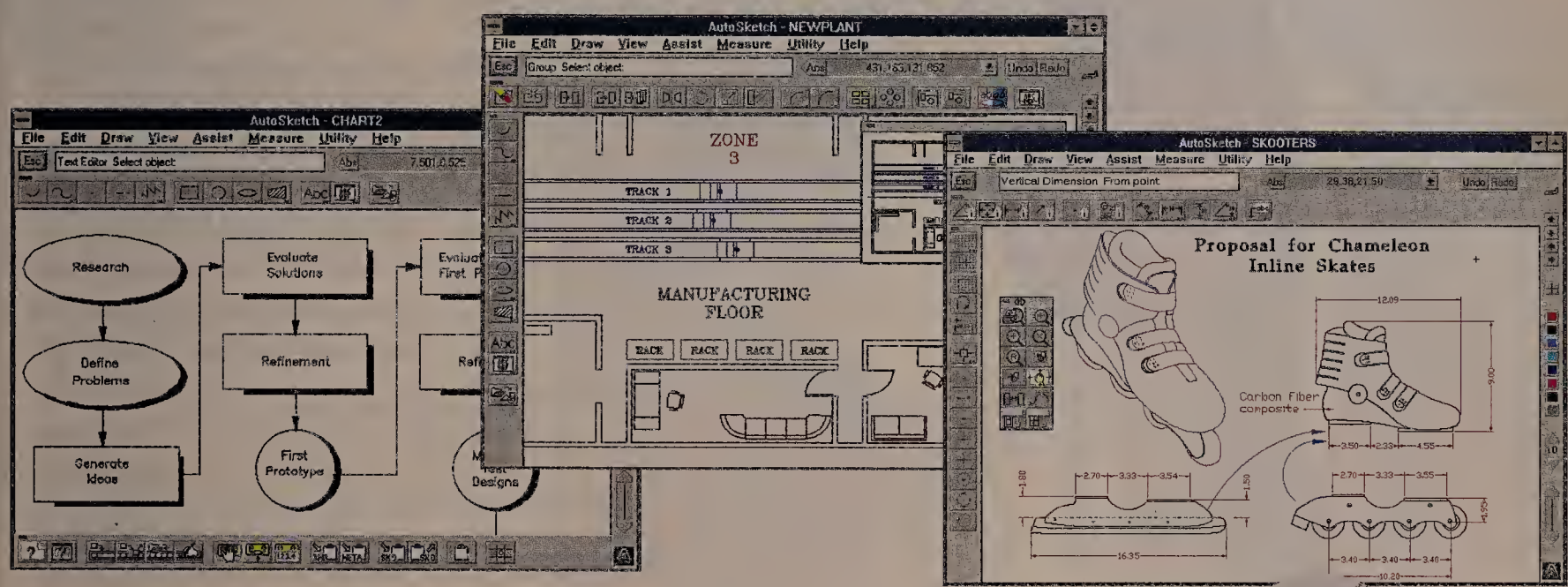

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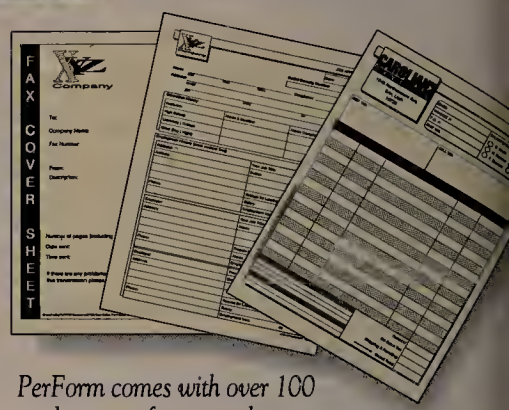

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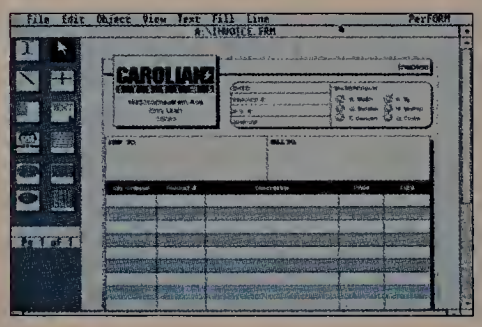

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USER GROUP TIPS

Helpful hints from members of the nation's user groups

Zooming In on a Great WinWord Button

Once you add a zoom button to your *Word for Windows 2.0* tool bar, you'll wonder how you ever lived without it. Clicking it gives you a drop-down arrow, which you drag or click to change your document's screen size.

To add the button, select *Tools•Options* from inside any document. Press **T** to select *Toolbar* from the Category box's icon list. In the Tools to Change list box, select the button you wish to replace; if you'd rather not replace an existing button, select any of the '[space]' listings. Check *Commands* inside the Show box, then go to the Commands list box and select *ViewZoom*. You can pick any icon from the Button list, but I recommend the magnifying glass. To make sure the new button is in all your documents, check *Global* in the Context box; if you want the button to appear only in documents made from the current document's template, check *Template* instead (this choice isn't available if your current document is based on the NORMAL.DOT template).

Select *Change*, then *Close;* the Options box will disappear, and a new—and extremely useful—zoom button will appear on your screen.

JAN ALTMAN
STANFORD/PALO ALTO PC USERS GROUP

Printing Nice Pages From DOS

If you use a dot matrix printer, you know that printing a large text file with the DOS command PRINT *filename* leaves text running across page breaks. Here's how to get decent-looking page breaks when printing text files from the DOS prompt to Epson and IBM Proprinter and compatible printers.

At the DOS prompt, type **EDLIN LONGTEXT** and press **<Enter>**, then type the letter **I** and **<Enter>**. On the next line, press **<Ctrl>-V**, type **[N**, press **<Ctrl->V** again, and type **H** (be sure to type capital *N* and *H*). Press **<Enter>**. On the next line,

TIM CLARK

press **<Ctrl>-Z<Enter>**. Press **E<Enter>** to return to the DOS prompt. Next, create a batch file named LONGPRNT.BAT:

```
COPY d:dir\LONGTEXT + %1 NEWFILE
PRINT NEWFILE
DEL NEWFILE
```

where *d:dir* is the drive and directory where you've stored LONGTEXT. Copy LONGPRNT.BAT to a directory listed in your AUTOEXEC.BAT's PATH statement. From then on, typing **LONGPRNT** *filename* will print your file with top and bottom margins.

WILLIAM BALL
HAL-PC, HUMBLE, TEXAS

WordPerfect Tables Quick as 1-2-3

WordPerfect 5.1 has a powerful table feature, but its multiple options can be confusing and intimidating. Don't be discouraged. Next time you need a table in a *WordPerfect* document, try creating it in your spreadsheet; it's faster and easier, and you don't have to estimate the size of your table before you create it. Once it's complete, save it as a WK1 file.

Inside *WordPerfect*, bring up the document your table belongs in and move the cursor to where you want to insert the table. Press **<Shift>-<F10>**; when you're prompted for a file name, type the name of your worksheet file, including the **.WK1** extension and press **<Enter>**. Your worksheet data will appear as a *WordPerfect* table.

If you want to import *part* of a worksheet, use *WordPerfect*'s <Ctrl>-<F5> Import procedure. But if you're importing a whole file, pressing **<Shift>-<F10>** is a lot quicker.

One last caveat: If you're importing a wide worksheet, change your font before you bring in the table. It's easier to avoid a table that's too wide for the margins than to fix one.

SHU S. LIAO
NAVAL POSTGRADUATE SCHOOL COMPUTER CLUB
MONTEREY, CALIFORNIA

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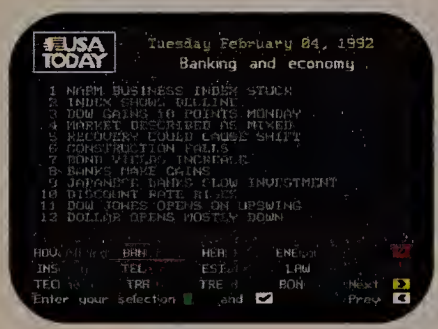

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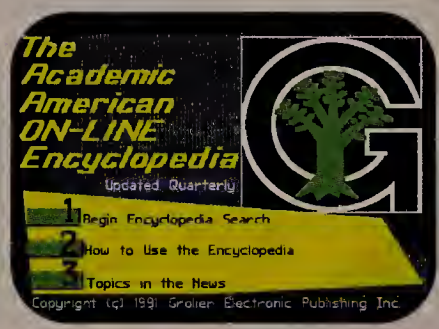

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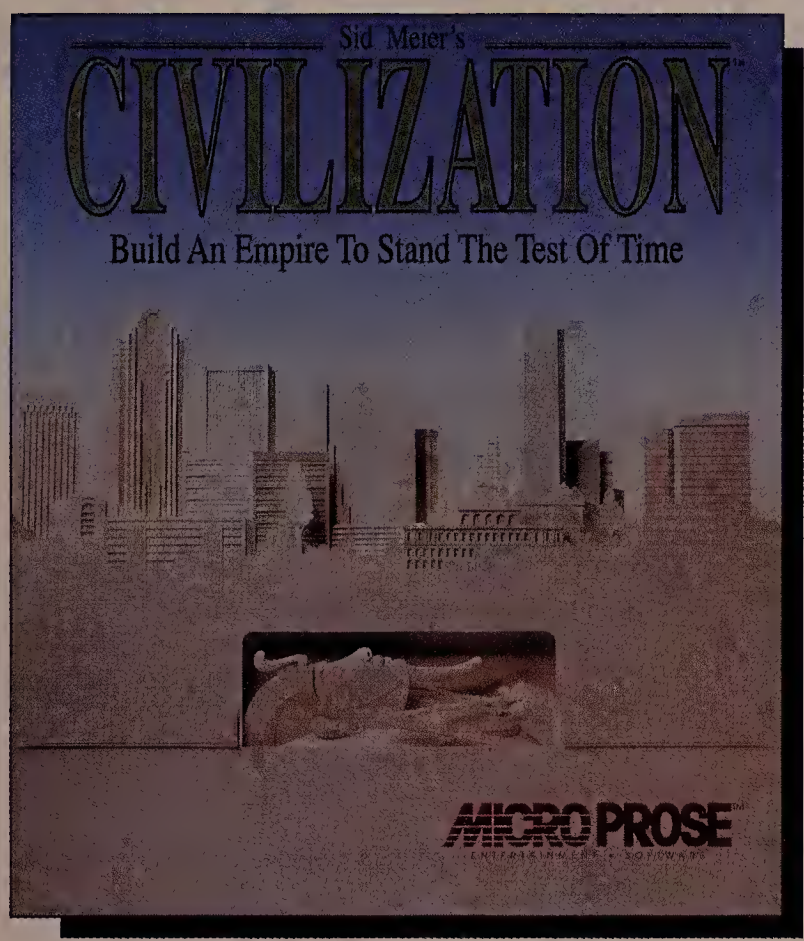

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- Be sure to follow these instructions—to qualify for the drawing, you must fill out the ballot correctly!
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Notebook computer

Laser printer

Dot matrix printer

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Forms software	
Communications	
LAN operating system	
Backup software	
Personal information manager	
Programming language	
Operating system/environment	
Presentation graphics	
Computer-aided design	
Project manager	
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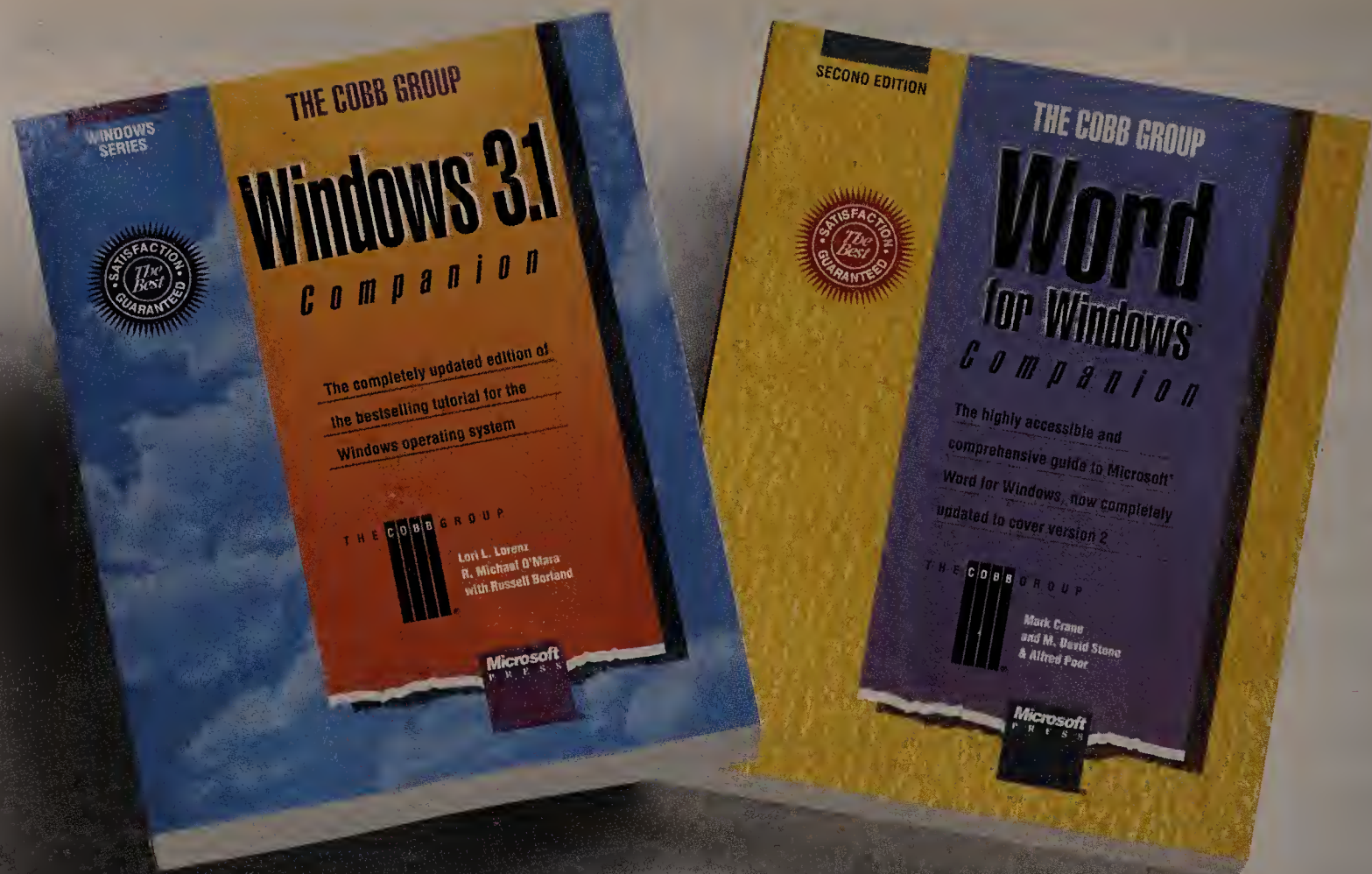

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STAR-DOT-STAR

EDITED BY BRETT GLASS

A global exchange of personal computer discoveries

A Quick Save in WordPerfect

For some time I've tried to come up with a *WordPerfect* macro to save my document and allow me to continue working. I tried {DISPLAY OFF}{Save}{Enter}y, but that worked only if the document had already been saved once and given a name. If the document was still nameless, I'd get an 'ERROR: Invalid drive/path specification' message and have to hit the <F1> key to continue. Very annoying.

After some attempts, I wrote a better macro for saving my document while I was working (see **FIGURE 1**). This macro will prompt me for a file name if the document doesn't have one yet, so I can use the same keystroke whether this is my first save or my tenth.

The macro's only quirk is that when I first save a document, I see the same old error message. After I've typed in a file name, I see it again. This is disconcerting at first, but not serious. The macro works fine despite the appearance of these messages.

BRUCE PURCELL
ELK GROVE, CALIFORNIA

```
{DISPLAY OFF}
{ON ERROR}{GO}NO_NAME~~
{Save}{Enter}y
{GO}END~
{LABEL}NO_NAME~
{TEXT}fname~File name: ~
{Save}{VARIABLE}fname~
{Enter}
{LABEL}END~
```

FIGURE 1: Use this WordPerfect macro to easily save named and unnamed files.

ANTHONY RUSSO

Editor's note: Since the macro uses macro-specific commands, you can't create it by simply recording keystrokes; you must use the macro editor. To get to this editor, press **<Home>**, *then* **<Ctrl>-<F10>**. *At the 'Define macro' prompt, type* **ALTS** *(assuming you want to run this macro by pressing <Alt>-S) and press* **<Enter>**; *at the 'Description' prompt, type* **Save and continue** *and press* **<Enter>** *again. Now you're ready to create the macro.*

The first command, {DISPLAY OFF}, is already there. Get past it by pressing **<Cursor Right>** *and* **<Enter>**. *To insert control keystrokes like {Enter} into the macro, press* **<Ctrl>-V** *followed by the key. To enter the {ON ERROR}, {GO}, {LABEL}, {TEXT}, and {VARIABLE} commands, press* **<Ctrl>-<Page Up>**, *select the command on the resulting pop-up list, and press* **<Enter>**. *Insert {Save} by pressing* **<F10>**. *Type the remainder of the text as it appears. Press* **<F7>** *when done.*

I couldn't figure out a way to avoid the error message, but I'm not a WordPerfect *expert. If anyone can figure it out, please let me know; I'd be delighted to publish the tip!*

Colons for Comments

In "50 Tips for DOS and Windows," Kay Nelson suggested putting quotes around redirection symbols when using REM to comment out lines in a batch file ("Help for Batch File Fanatics," January 1992, page 209). I prefer to use a colon, as in **:REM**, at the beginning of any comment line. This causes DOS to think that the line is a label, and redirection symbols on the line are therefore ignored. Also, even if ECHO is on, DOS won't echo the line to the screen.

CHAN SHIPPY
COLOME, SOUTH DAKOTA

Editor's note: For several reasons, I use colons instead of REM when I place comments in my batch files. First, as Mr. Shippy points out, there's no need to worry about DOS reacting to redirection symbols on the line in unexpected ways; second, the line is never echoed regardless of the ECHO state. Finally, DOS skips over a line that starts with a colon without trying to interpret it any further, and gets right on with the work of handling the next line. This makes the entire batch file run much faster—especially if you've put in lots of comments.

*I don't recommend using :REM as your standard way to set off a comment, though. One day—when you least expect it—you may have a reason to use the word REM as a label (it's a perfectly legal label, as are all DOS batch commands). My suggestion: Use a colon followed by an asterisk—***:****—instead. An asterisk isn't a legal label, and it draws attention to the comment.*

Defy WinWord Document Disorder

When you load *Word for Windows*, the program assumes you keep your data files in your program directory. Unless you tell it otherwise, that's where it will save new files. I can't tell you how many times I've searched for a "missing" file, only to find it lurking in my *WinWord* directory.

Fortunately, *Word for Windows* has a very powerful built-in macro language

that let me build a solution to the problem. I wrote an AutoExec macro (see **LISTING 1**) that runs when you first load *Word*, prompting you to pick a data directory. You're not even limited to eight-character labels for your directo-

```
Sub MAIN
Dim TypeArr$(4)
TypeArr$(0) = "Jones Account"
TypeArr$(1) = "Smith Account"
TypeArr$(2) = "Personal Letters"
TypeArr$(3) = "Temporary"
TypeArr$(4) = "Great American Novel"
TryAgain:
Begin Dialog UserDialog 325, 112
 Text 6, 10, 300, 18, "Project Name or Path"
 ComboBox 6, 25, 200, 85, TypeArr$(), .ProjDir
 OKButton 250, 80, 40, 18
End Dialog
Dim Project As Dialog UserDialog
Dialog Project
Answer$ = Project.ProjDir
Select Case Project.ProjDir
 Case "Jones Account"
  ChDir "C:\jones"
 Case "Smith Account"
  ChDir "C:\smith"
 Case "Personal Letters"
  ChDir "C:\personal"
 Case "Temporary"
  ChDir "C:\temp"
 Case ""
  Goto TryAgain
 Case Else
  Err = 0
  On Error Goto ErrorMsg
  ChDir Answer$
  Goto Done
ErrorMsg:
 Prompt$ = "Create Directory: " + Answer$ + " ?"
 Num = MsgBox(Prompt$, "Path Not Found", 36)
 If Num = - 1 Then
  MkDir Answer$
  ChDir Answer$
 Else
  Goto TryAgain
 End If
Done:
End Select
```

LISTING 1: This Word for Windows AutoExec macro pops up a directory selector every time you load the program.

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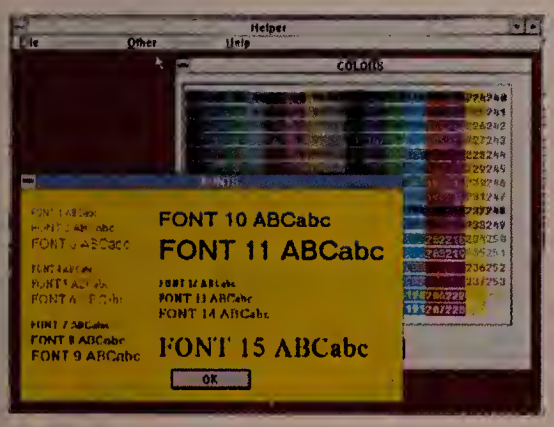

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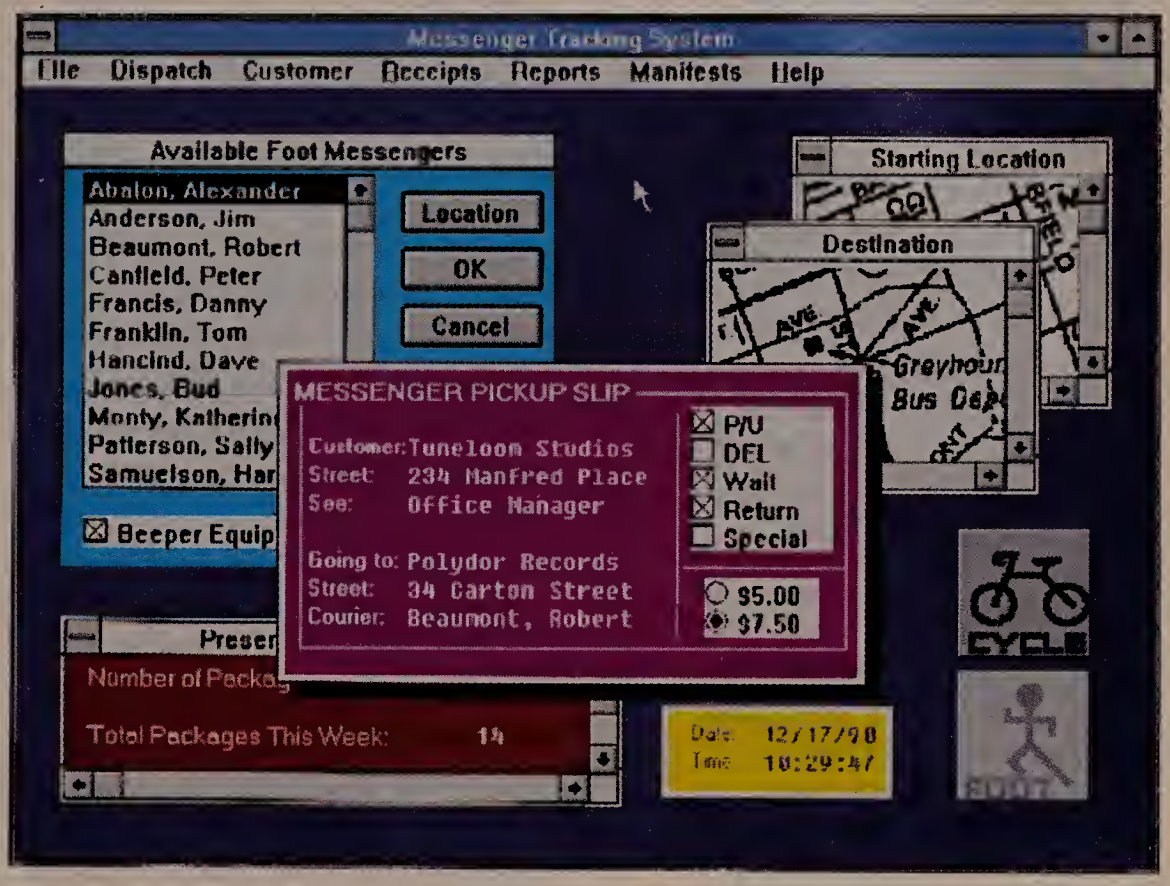

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ries, but can use descriptive names like Jones Account or Personal Letters.

If you want to change directories again during a session, simply rerun AutoExec as you would any other macro (from the macro dialog box or with an assigned shortcut key). Remember to modify the case statements in the listing to reflect your directories and subject headings.

DAVID WALSKE
BEVERLY HILLS, CALIFORNIA

Editor's note: Windows 3.1 *allows you to specify a separate start-up directory, letting you pick a default other than WINWORD, but you'll still find this macro useful, because it lets you choose between data directories on the fly.*

To enter this macro, select Tools•Macros, *type* **AutoExec** *as your macro name, and select* Edit. *Enter the macro as shown (except for the 'Sub MAIN' at the top and the 'End Sub' at the bottom, which the editor provides for you). Try running the macro by clicking on the Start button.*

Because this macro has the name AutoExec, it'll run every time Word for Windows *starts up. When it runs, you can select a directory from the list or type in any other directory name. If you type a directory name that doesn't exist, the macro will offer to create it for you—making it easy to create new directories as you sort through your documents. If you want a particular session to start without this macro, use the program or File Manager's* File•Run *command, and enter* **Winword /m** *at the command line.*

Move Mountains of Files From Disk to Disk

Windows' File Manager lets you move files from one disk to another without manually copying them and deleting them. This trick is documented in the manual, but the explanation is cryptic. To move files or directories, highlight everything you want to move, then, while holding down the mouse button and the <Alt> key, drag the file(s)

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BASICS: WINDOWS 3.1

WINDOW OPERATIONS

These steps work in most windows. All mouse actions use the left mouse button: "Click" means quickly press and release the button, "double-click" means quickly click the button twice, and "drag" means move the mouse while holding down the button. Menu options that you select with a mouse are in italics.

Note: <Alt><Space> opens the application's Control menu (for DOS applications running under *Windows*, you must hold down **<Alt>** while you press **<Space>**); **<Alt><Minus>** opens the current document's Control menu.

Action	Pointer position/ Button action	Keyboard commands
Bring launched application to foreground	Application window/Click, or Icon/Double-click	Hold down **<Alt>**, **<Tab>** until application name appears in box
Size window	Border or corner/Drag border outline	Open Control menu, **S**, choose border with cursor key, size with cursor keys, **<Enter>**
Move window	Title bar/Drag window outline	Open Control menu, **M**, move window with cursor keys, **<Enter>**
Minimize window to icon	Minimize button/Click	Open Control menu, **N**
Maximize icon or application window to fill screen, or document window to fill application window	Title bar/Double-click; or Icon/Click, *Maximize*	Open Control menu, **X**
Restore icon or window to previous size	Icon or title bar/ Double-click	Open Control menu, **R**
Close foreground document and its window	Document Control menu box/Double-click	**<Ctrl>-<F4>**
Close foreground application and its window	Application Control menu box/Double-click	**<Alt>-<F4>**

PROGRAM MANAGER

Every time you start *Windows*, Program Manager starts as well (unless you've specified a replacement). Use Program Manager to launch applications, add new ones, create new groups, and move programs from one group to another.

Action	Pointer position/ Button action	Keyboard commands
Select and open group window	Group icon/Double-click	**<Ctrl>-<Tab>** until group icon selected, **<Enter>**
Select program icon	Program icon/Click	Cursor keys
Run program	Program icon/Double-click	Select program icon, **<Enter>**
Move program to new group	Program icon/Drag to new group	Select program icon, **<F7>**, **<Down>** to select group, **<Enter>**
Copy program to new group	Hold down **<Ctrl>**, Program icon/Drag to new group	Select program icon, **<F8>**, **<Down>** to select group, **<Enter>**
Exit *Windows*	Control menu box/ Double-click, *OK*	**<Alt>-<F4>** **<Enter>**

Fold Here

FILE MANAGER

A File Manager directory window defaults to a two-pane display. The pane on the left shows a directory tree of the current drive. The pane on the right lists the files and subdirectories of the left pane's selected directory.

Action	Pointer position/ Button action	Keyboard commands
Move between directory pane, file pane, and drive icons	Pane or icon/Click	**<Tab>**
Select drive	Drive icon/Click	**<Ctrl>-***drive letter*
Select directory or file	Directory or file name/Click	**<Up>**, **<Down>**, or first letter of name until selected
Expand branch one level	Directory name/ Double-click	Select directory, **<Plus>**
Collapse branch	Directory name/ Double-click	Select parent directory, **<Minus>**
Expand branch completely	*Tree•Expand Branch*	**<Asterisk>**
Expand all branches on disk	*Tree•Expand All*	**<Ctrl>-<Gray Asterisk>**
Select adjacent files	First file/Click, hold down **<Shift>**, Last file/Click	Select first file, hold down **<Shift>**, cursor to last file
Select nonadjacent files	First file/Click, hold down **<Ctrl>**, click on additional files	Select file, **<Shift>-<F8>**, cursor to next file, **<Space>** to select; **<Shift>-<F8>** when done
Select all files in directory	*File•Select Files•Select•Close*	**<Slash>**
Deselect all files in directory	*File•Select Files•Deselect•Close*	**<Backslash>**
Delete selected file(s) or directory	*File•Delete•OK•Yes* or *Yes to All*	**<Delete><Enter>**, **Y** or **A**
Copy selected file(s) to a different drive	Selection highlight/ Drag to drive or directory icon, *Yes*	**<F8>**, type destination drive and path, **<Enter>**
Copy selected file(s) to a different directory on same drive	Selection highlight/ Hold down **<Ctrl>**, drag to drive or directory icon, *Yes*	**<F8>**, type destination, **<Enter>**
Move selected file(s) to a different directory on same drive	Selection highlight/ Drag to directory icon, *Yes*	**<F7>**, type destination directory, **<Enter>**
Move selected file(s) to a different drive	Selection highlight/Hold down **<Alt>** or **<Shift>**, drag to drive or directory icon, *Yes*	**<F7>**, type destination drive, **<Enter>**
Open another directory window	*Window•New Window*	**<Alt>WN**
Cascade directory windows	*Window•Cascade*	**<Shift>-<F5>**
Tile directory windows	*Window•Tile*	**<Shift>-<F4>**
Renew directory window	*Window•Refresh*	**<F5>**

Tip: When moving or copying a directory or file, both the source and the destination must be visible on screen.

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ADVANCED: WINDOWS 3.1

TASK LIST

The Task List gives you easy access to all your currently launched programs.

Action	Steps
Display Task List	**<Ctrl>-<Esc>**; double-click desktop; or *application Control menu, Switch to*
Switch to another program	Select program name, or **S***witch to* or **<Enter>**; or double-click on program name
Cascade windows	**C***ascade*
Tile windows	**T***ile*
Arrange program icons	**A***rrange Icons*
Close program	Select program name, **E***nd Task*

RUNNING DOS PROGRAMS IN WINDOWS

Action	Steps
Switch to another program without exiting DOS program	Hold down **<Alt>**, **<Tab>** until desired program name appears
Toggle DOS program between full-screen and windowed display	**<Alt>-<Enter>** (enhanced mode only)
Copy text from DOS program to Clipboard	*Control menu* • **E***dit* • *Mar***k**, select text, **<Enter>**
Insert text in DOS program as keystrokes from Clipboard	*Control menu* • **E***dit* • **P***aste*
Change multitasking priorities	*Control menu* • *Settings*
Change font size for windowed display	*Control menu* • **F***onts*

Note: When a DOS program is running full screen, you can place it in a window and select the Control menu by pressing **<Alt>-<Space>**.

ADVANCED PROGRAM MANAGER OPERATIONS

Action	Steps
Start an application every time Windows is started	Move program icon to StartUp group
Add new program to selected program group	**F***ile* • **N***ew* • *Program* **I***tem* • *OK*, enter information in dialog box, *OK*
Create new program group	**F***ile* • **N***ew* • *Program* **G***roup* • *OK*, enter information in dialog box, *OK*
Change program's default working directory	Select program icon, **<Alt>-<Enter>**, **W***orking Directory*, type path name, **<Enter>** or *OK*
Assign shortcut key combination to program	Select program icon, **<Alt>-<Enter>**, **S***hortcut key*, type character (<Ctrl> + <Alt> is added automatically), *OK*

Note: You can assign keys other than <Ctrl>-<Alt>-*key* combinations to shortcuts. You can also assign <Ctrl>-<Shift>-*key*, <Alt>-<Shift>-*key*, and <Ctrl>-<Alt>-<Shift>-*key* combinations to shortcuts by holding down those keys.

FILE MANAGER

Action	Steps
Rename selected file or directory	**F***ile* • *Re***n***ame*, type new file name, *OK*
Find file or directory	**F***ile* • *Sear***ch**, change file and/or directory names if needed, *Search All Subdirectories* if needed, *OK*
Associate file extension with program	**F***ile* • **A***ssociate*, type extension if none is displayed, select program from list box below Associate With field if necessary, *OK*
Run program	Double-click on icon for program or for data file associated with program; or select icon, **<Enter>**
Move split bar to left or right	Drag line between tree and directory panes; or **V***iew* • *Split*, cursor to new position, **<Enter>**
Change File Manager display font	**O***ptions* • **F***ont*, select font options, *OK*
Format disk	**D***isk* • **F***ormat Disk*, enter information in dialog box, *OK*

Tip: You can drag a file from a File Manager window to an application window to create an icon or to an application icon to run the application.

OBJECT LINKING AND EMBEDDING (OLE)

An *object* is a file, a drawing, a graph, a range in a worksheet, or a block of text in a document. A *linked object* in a destination document will reflect any changes made to the object in the source document. Links can be created only from saved documents. *Embedding* an object in a destination document allows you to edit it later with the application used to create the object.

All our examples use *Windows Write*, but other programs also offer OLE.

Action	Steps
Embed drawing in *Write* document	Copy drawing from graphics program to Clipboard, cursor to desired position in *Write* document, **<Shift>-<Insert>** or **E***dit* • **P***aste*
Link drawing with *Write* document	Copy drawing from graphics program to Clipboard, cursor to desired position in *Write* document, **E***dit* • *Paste* **L***ink*
Bring up graphics program to edit linked or embedded drawing	Double-click on linked or embedded drawing

TRUETYPE FONTS

TrueType fonts are scalable typefaces that come with *Windows 3.1*. You can identify a TrueType font by the *TT* in front of its name in a font list.

Action	Steps
Bring up Font dialog box	In Main Group window in Program Manager, double-click on Control Panel icon, **S***ettings* • **F***onts* or double-click on Fonts icon
Disable TrueType fonts	Bring up Font dialog box, **T***rueType*, clear **E***nable* TrueType Fonts box, *OK*, exit and reenter *Windows*
Add TrueType fonts	Bring up Font dialog box, **A***dd*, select drive and directory, select fonts from List of **F***onts* box or **S***elect All*, *OK*

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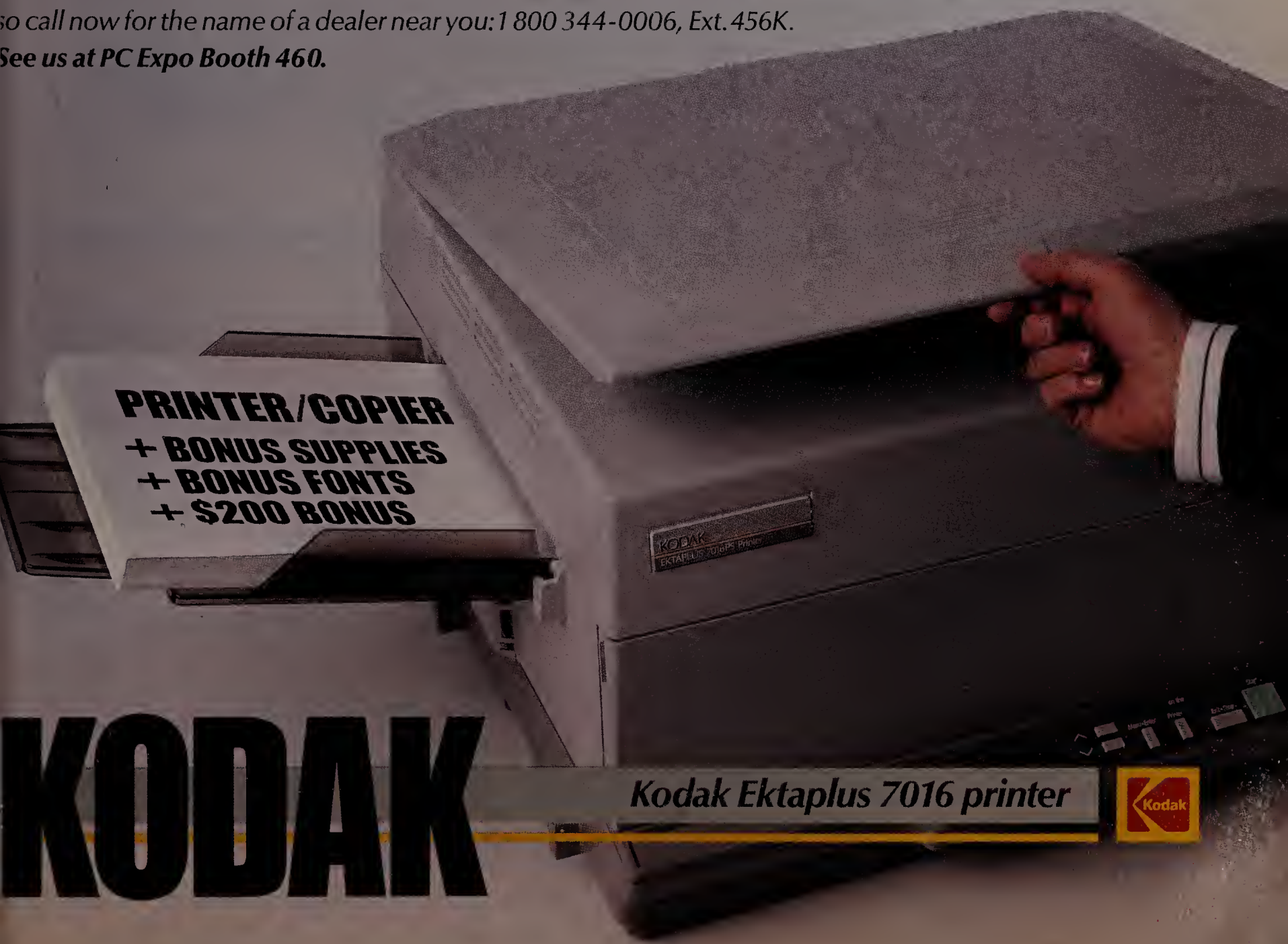

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or directory(ies) to the destination disk and drop them off. Depending on your confirmation settings, you may see a dialog box that asks for confirmation. Once you answer affirmatively, File Manager will move your files.

If you don't hold down the <Alt> key, File Manager will copy rather than move the files. In fact, File Manager clues you in visually as to whether you're moving or copying—drag some files and while you're still holding down the mouse button, try pressing and releasing **<Alt>**. The file icons in the source directory will appear and disappear as you do so. Whether the files are copied or moved depends on whether you're pressing <Alt> when you release the mouse button.

One caveat: Unless you use an undelete utility, you can't compare the file you have after the move with the one you started with. But I've been doing this for about 16 months and have yet to encounter a problem. This technique really saves an incredible amount of extra work.

GEOFF CRENSHAW
VISALIA, CALIFORNIA

Editor's note: You can also pick up and move entire branches of a directory tree within File Manager. This makes it a snap to archive files by moving them to floppies, deleting them from the hard disk as you do so.

Looping in Lotus

Occasionally I need to write a *1-2-3* macro that loops through a list of items in a worksheet. For instance, if I'm printing mailing labels from a list of clients, I might want to move each address in turn to a "scratch" area, format it, then send it along to the printer. The lists are often very long, so it doesn't pay to write a line of code for each of them.

In the attached example (see **FIGURE 2**), a looping macro that starts in cell C3 copies the first name in the A3..A7 range to A20, prints the name, then repeats the process with the next name down until the bottom of the list; there are only five names in this example, but the macro as written handles up to 300.

I use *1-2-3*'s text concatenation operator (represented by an ampersand) to create a reference to a new cell address each time the loop cycles. The formula in cell C4 creates a concatenated text string from segments in B13..B15 and a loop counter in G14. Each time the loop executes, the string in C4 changes. The iteration count is displayed in cell G13 and converted to a string in G14 via the @STRING() function.

RICK BROWN
MARIETTA, OHIO

Editor's note: When you create this sample worksheet, enter the formula **+B13&G14&B15&B14&B15** *into cell C4 and* **@STRING(G13+3,0)** *into cell G14. Enter the rest of the numbers and labels as they appear in* **FIGURE 2**. *Remember, however, that when you enter a label that begins with a slash (/), type an apostrophe (') first. Also, use* /Range • Name • Label • Right *to name cell C3* **\P** *so the macro will run when you press <Alt>-P.*

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Brett Glass is a contributing editor for PC World.

```
    A      B      C                          D      E      F      G                    H
1   LIST          MACRO TO SEQUENTIALLY COPY ELEMENTS OF A LIST
2
3   Jan      \P   {LET G13,0}~                                   sets LOOPCOUNT to 0
4   Rich          /CA9~A20~                                      copies value to target
5   Ed            /PPRA20..A20~GQ                                prints each list element
6   Paula         {LET G13,G13+1}~                               increments LOOPCOUNTER
7   Anna          {IF @COUNT(A3..A300)<=G13}{QUIT}               QUITs loop at end of list
8                 {BRANCH C4}~                                   loops back to start
9
10
11
12            LIST OF MACRO TEXT SEGMENTS                        LOOPCOUNTER
13            /CA                                                 6  # of loop executions
14            A20                                                9   row used by macro
15            ~
```

FIGURE 2: This iterating spreadsheet loops through data, printing each name in a separate process.

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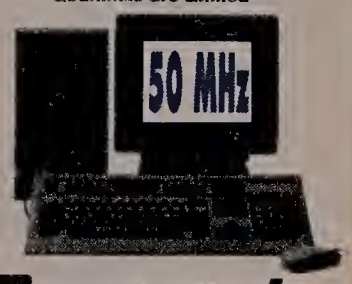

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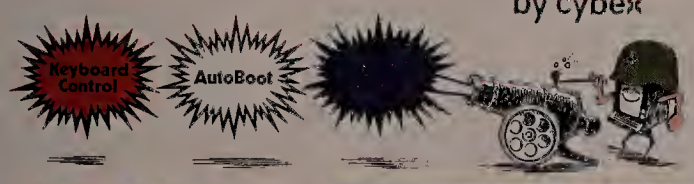

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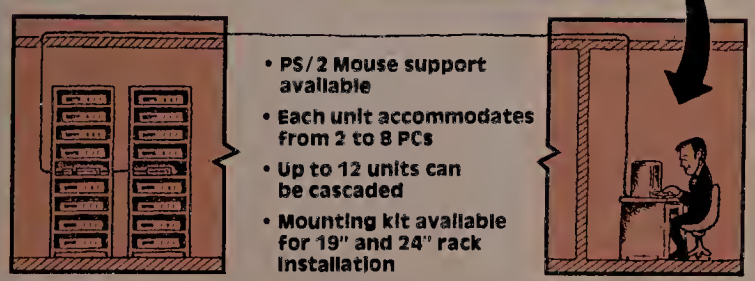

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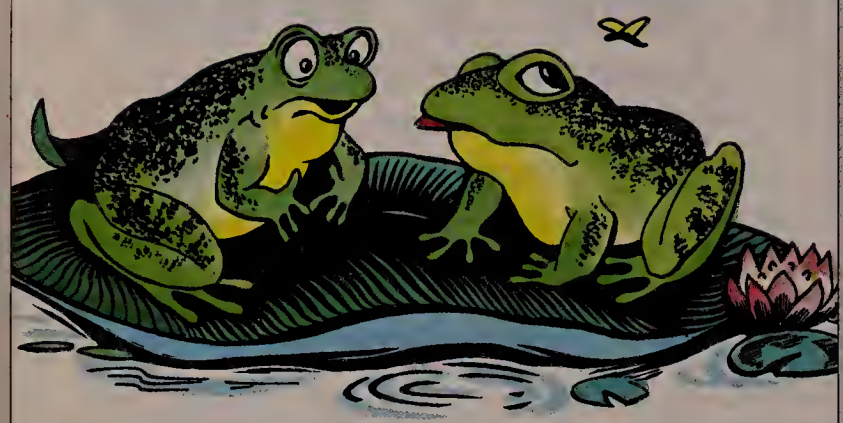

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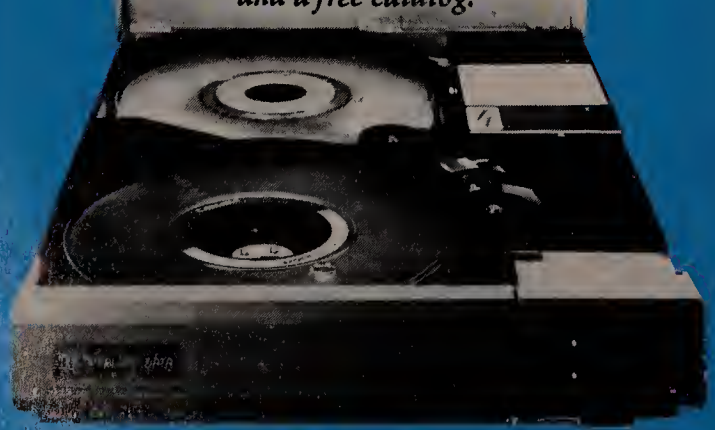

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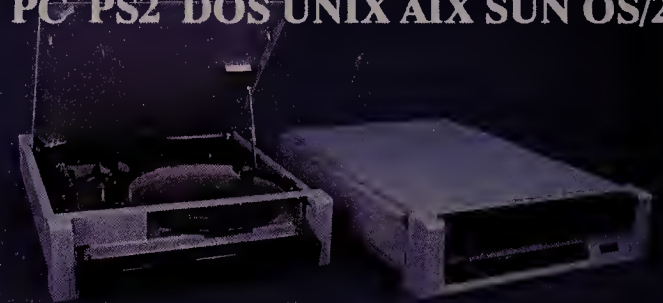

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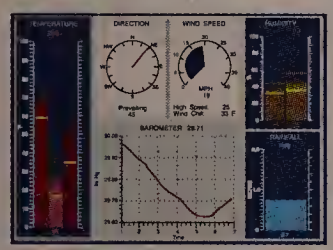

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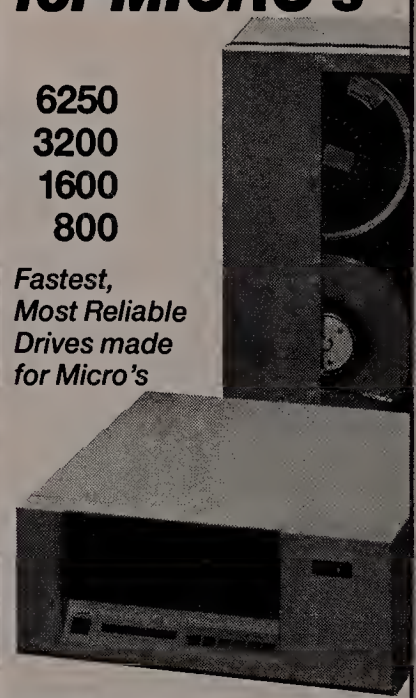

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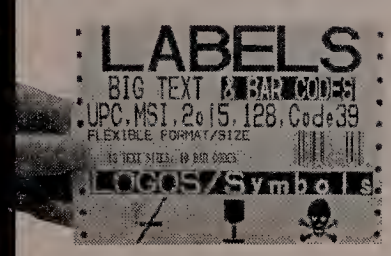

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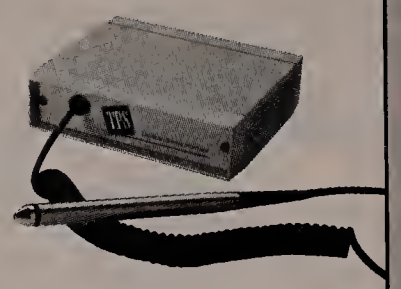

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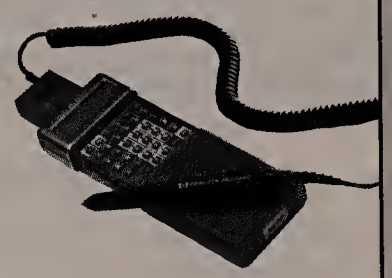

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NEC CD GALLERY Bundle — comes with 7 CD disc titles, headphones, speakers, and CD-ROM player for a total bundled CD Multimedia solution pack.
- **CD GALLERY** w/NEC CDR36 Player 589
- **CD GALLERY** w/NEC CDR73 Player 848

Pro AudioSpectrum Multimedia Upgrade Kit — Comes with a Sony CDU-541 internal CD player, Pro AudioSpectrum stereo sound board, MS Windows Multimedia 1.0 Extensions, Jones in the Fast Lane & Compton's Multimedia Encyclopedia CD disc titles and much more.
- **Pro AudioSpectrum MPC Upgrade Kit** 895

Pro AudioSpectrum CDPC Multimedia Sub-System Fully integrated MPC solution & much more ... 1099

LASER PRINTERS, UPGRADES, SCANNERS, MULTIMEDIA / VIDEO — OUR SPECIALTY

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At 600 x 600 dpi, everything on your page looks incredibly better: images are remarkably clear and detailed, thin lines and round edges are much sharper.

PS-815 MR 600 x 600 dpi laser $3995
PS-825 MR 600 x 600 dpi laser 4795

- **ColorScript 100 model 10**, PostScript $5995
- **ColorScript 100 model 30i** 11"x17", PS 8595
- ColorScript consumables ..... CALL
- **QMS PS-410**, 45 fonts, ATM, PostScript 1695

QMS BEST OF 1990 — PC Magazine

Texas Instruments

microLaser Printers from TI

microLaser Turbo models incorporate Adobe® PostScript Level 2 and a Weitek 8220 RISC-based 16-MHz co-processor. Automatic emulation switching (PostScript and HP PCL), automatic port switching. Optional SCSI hard disk. All units can be upgraded to Turbo models.

- **microLaser Plus Basic** (HP emulation, 9-ppm) ... $895
- **microLaser Plus PS-17** (17 fonts, 9-ppm) 1195
- **microLaser Plus PS-35** (35 fonts, 9-ppm) 1495
- **microLaser XL PS-17** (17 fonts, 16-ppm) 2395
- **microLaser XL PS-35** (35 fonts, 16-ppm) 2659
- **microLaser Turbo PS-35** (35-fonts, 9-ppm) 2059
- **microLaser XL Turbo PS-35** (35-fonts, 16-ppm) 3359
- For microLaser upgrades & consumables ..... CALL

newgen — The Hi-Res People

NewGen brings you high speed and high resolution PostScript printing at affordable prices. NewGen printers have **ART** (Automatic Recognition Technology) to automatically recognize which port is in use and what emulation to use. These models also include **IET** (Image Enhancement Technology) to smooth out the jaggies. Output from NewGen printers is extraordinary.

- **Turbo PS/400p** (400 x 400-dpi + IET, ART) ... $2275
- **Turbo PS/840** (800 x 400-dpi, ART) 3495
- **Turbo PS/840a** (800 x 400-dpi + IET, ART) 3995

Upgrade any laser printer w/ additional memory, at time of purchase, & SAVE.

NEC

Silentwriter2 Model 95 - new model

The Model 95 delivers the latest in DDS and Windows compatibility and performance by incorporating Adobe PostScript Level 2 and HP PCL Level 5 and Level 4 emulation. Comes with Automatic Interface Monitoring for multi-computer sharing between PC and Macintosh. Improved paper handling. 250-sheet paper feeder and automatic envelope feeder are built in. Comes with long-life micro-fine toner cartridge. 6-ppm, 300 x 300-dpi, 35 PostScript fonts, 14 bitmap & 8 scalable HP LaserJet fonts, 2-MB RAM expandable to 5-MB.

- **Silentwriter Model 95** w/ 2-MB RAM ..... $CALL
- **Silentwriter Model 95** w/4-MB RAM ..... CALL
- Optional 250-sheet extra paper feeder ..... CALL

High Performance Video Cards

- **ATI GRAPHICS VANTAGE** 1-MB $385
- **ATI GRAPHICS ULTRA** 1-MB 575
- **ATI 8514 ULTRA** 1-MB (for 8514/A monitors) 539
- **Hercules Graphic Station** 1-MB, TI 34010 539
- **Hercules Graphic Station Gold16** 16-bit color 379
- **Hercules Graphic Station Gold16+2** 16-bit color ... 489
- **Hercules Graphic Station Gold24** 24-bit color 429
- **Hercules Graphic Station Gold24+2** 24-bit color ... 549
- **Number Nine #9GXi Level 25** - Fastest 24-bit true-color card on the market, PC Week, 10/28/91. 1280 x 1024 res., 72-Hz refresh, TI 34020 1579
- **Orchid Fahrenheit 1280** - graphics accelerator for MS Windows. Windows will redraw up to 12 times faster than regular Super VGA cards. Comes w/ 1-MB RAM, 1280 x 968, 72-Hz refresh 365
- **OPTA Mona Lisa** - PC Magazine Editor's Choice 1/14/92. Best functionally-balanced true-color 24-bit video card on the market. 1024 x 768 x 24-bit. TI 34020, 72-Hz refresh. Optional JPEG file compressor available to minimize file size.
  - **Mona Lisa** w/2-MB VRAM 1495
  - **Mona Lisa** w/4-MB VRAM (for hi-color) 1695
  - **Mona Lisa JPEG** compression board 779
- **Truevision 1024-32 Graphics Engine** - True-color, 32-bits/pixel, accelerated Windows drivers. 2695

Video Monitors

radius

- **Radius Full Page Pivot Display** - New Lower Price includes monitor & SVGA MultiView card $1295
- **Radius 19-inch Two Page Display (TPD)** includes monitor & TPD/PC card (ISA) 1795
- **Radius 21-inch Two Page Display (TPD)** includes monitor & TPD/PC card (ISA) 1995
- **Radius Precision 20 Color Monitor** 20-inch, 1280 x 1024 res. non-interlaced, 72-Hz refresh, Trinitron tube, 0.31-mm pitch 2895

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- **MF-5221** 21-inch, 1280 x 1024, 0.31-mm 2395
- **MF-5321** 21-inch, 1280 x 1024, 0.31-mm, A/R 2595
- **MF-5421** 21-inch, 1600 x 1200, 0.26-mm, A/R 2799

NEC

- **3FGx** 14-inch non-interlaced flat screen color $629
- **4FG** 15-inch 70-Hz, noninterlaced, AccuColor 759
- **5FG** 17-inch 70-Hz, noninterlaced, AccuColor ... 1369
- **6FG** 21-inch 70-Hz, noninterlaced, AccuColor ... 2899
- **OCLI Filter** add-on for NEC 3FGx & 4FG 82
- **OCLI Filter** add-on for NEC 5FG 129
- **OCLI Filter** add-on for NEC 6FG 195

Scanners, Image Editors & OCR

OCR (Optical Character Recognition)
- **Logitech Catchword** (for Scanman) $145
- W **OmniPage Professional 386** by Caere 639
- W **ReadRight for Windows** by DCR Systems 295
- **ReadRight for DOS** by OCR Systems 299
- W **The Typist + Graphics** from Caere (comes with hand scanner, DCR s/w and interfaces— complete, effective & inexpensive DCR 385
- W **Wordscan** by Calera 219
- W **WordScan Plus** by Calera 665

IMAGE EDITORS (photo manipulation software)
- W **Aldus PhotoStyler** v1.1 (NEW & HOT!!!) 519
- W **Halo Desktop Imager** (great & inexpensive) .. 99
- W **IMAGE-IN Color** Full Pack (new version) 695
- W **Pictura Publisher v3.0** by Micrografx ..... CALL
- **Pixel Photo** hi-performance 24-bit color editor .. 795
- W **Photo Finish** by ZSoft 117
- W **Publisher's Paintbrush** for Windows 3.0 285
- **Tampra Pro** by Mathematica (24-bit color) 359
- W **WinRix** by Rix Software (color image ed) 295

SCANNER SYSTEMS

All scanners listed below include an interface, scanning software & scanner unit. If you purchase any of our OCR software listed above with a Microtek ScanMaker 600Z, you can take 5% off the bundled price of scanner + OCR.

- **Logitech Scanman 32** 400-dpi, 32 gray levels $158
- **Logitech Scanman 32** w/Catchword DCR 229
- **Logitech Scanman 256** w/Ansel software 285
- **Logitech Scanman 256** w/Catchword DCR 429
- **Nissan GS** for Windows 3.0 w/Image-In 229
- **Nissan GS** w/Perceive DCR & Image-In 335
- **Nissan Spectra** Color hand-held scanner 599

MICROTEK

ScanMaker 600Z

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600-dpi color/gray scanner. 16.7 million colors (24-bit) and 256 gray-scale. Bundled w/ **PhotoStyler** image editing software for Windows. Ideal for DCR III PUBLISH! Magazine ★★★★-1/2 stars —best scanner rating in its class. 1-yr warranty.

Microtek ScanMaker 600Z $1335

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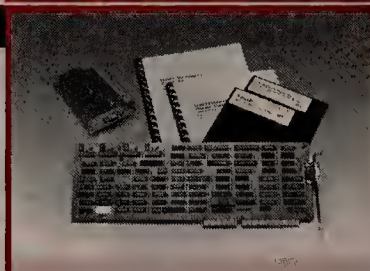
Microtek ScanMaker 1850 ..... $1995



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- **EP-S Toner** Cartridge for HP, QMS, etc 85
- **Hi-Res Toner** for NewGen, LaserMaster 159
- **Hi-Density Toner** for NewGen, LaserMaster . 159

PRINTER MEMORY UPGRADES (5-yr warranty)
- **HP LaserJet** 1-MB, 2-MB, 4-MB ..... 95 / 145 / 239
- **HP LaserJet IIIsi** 1-MB / 4-MB ..... 109 / 395
- **NEC Silentwriter 90** 2-MB 229
- **Okidata OL400** 1-MB / 2-MB ..... 129 / 195
- **Okidata OL800** 2-MB / 4-MB ..... 199 / 299
- **Panasonic** (4420 / 4450 / 4450i / 4455) ..... CALL
- **QMS PS-410** 1-, 2-, 3-, 4-MB . 139 / 179 / 239 / 299
- **TI microLaser** 1-MB SIMM upgrade 95

DP-TEK TruePoint 600x600-dpi printer controller upgrade for your HP LJ II & III or Canon LBP4. Special SALE Price - while supplies last 1295

Color Printers

QMS
- **ColorScript 100 model 10** (8½ x 11 & 14) $5995
- **ColorScript 100 model 30i** (11 x 17) 8595

Seiko Instruments
- **ColorPoint CH5504** 6-MB RAM, A-size $4995
- **ColorPoint PSX 4** (ultra fast, 10-MB RAM) 6995

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- **SketchMate** A-size plotter & vinyl sign cutter .. 629
- **SketchMate** B-size plotter (11" x 17") 769
- **SketchMate** B-size plotter & vinyl sign cutter .. 959
- **DXY-1100** 8-pen A-B-size flatbed plottar 769
- **DXY-1200** 8-pen A-B-size flatbed plotter 999
- **DXY-1300** 8-pen A-B-size flatbed plottar 1359

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- **XLP 12" x 12"** tablet, pen, cursor $289
- **IS/ONE 8½" x 11"** tablet, pen, cursor 329
- **IS/ONE 12" x 12"** tablet, pen, cursor 358
- **IS/ONE 12" x 17"** tablet, pen, cursor 595

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- **Wacom 12" x 12"** drawing tablet, pen & puck 745
- **Wacom 12" x 18"** drawing tablet, pen & puck .. 1095

The Wacom systems listed above come with a pressure-sensitive pen and a standard 4-button cursor.

CAD SOFTWARE TITLES
- **AutoSketch** version 3.0 149
- **DesignCAD 2D / DesignCAD 3D** ..... 175 / 195
- W **Orafix CAD for Windows** 439
- **Generic CAD Level 6.0** (new version) 295
- W **MacDraft** (new product for Windows) 317
- **Mannequin** by HumanCAD 449

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- **XAPSHOT** w/ComputerEyes RT bundle 959
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Pacific Page/XL..... $279/$649
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AST 63V, 386, 60 MG .. $2299
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Panasonic CF270,
16 MHz, 60 MG, VGA .. $1749
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386SX-20, 60MG, VGA . $2499

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TM 2000/20 MG $969
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Intel Satisfaxtion..... $319
Intel Scanner Option $199
Intel Snap-In 386 ..... $339

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Toshiba 3½" 1.44 ..... $69
Colorado Jumbo 120.... $209
Colorado Jumbo 250.... $269

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Panasonic LK-MC 501B . $369
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Netware 3.11 5 User $699
Netware 3.11 10 User .. $1599
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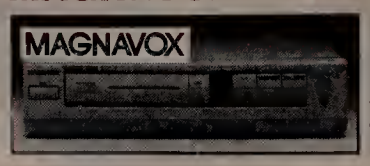

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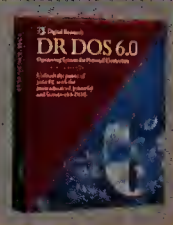

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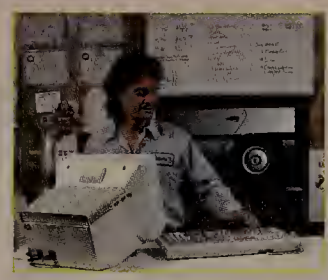

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THE HOME OFFICE

BY STEVE BASS

The practical guide to home/office computing

I know you've been there. It's Sunday afternoon and you're trying to bulldoze through a project due Monday. Then you get a software hang-up.

You'd like to call tech support, but hardly anyone answers the phone on weekends. After many a weekend crisis, I've found solid, immediate, and sometimes even free alternatives to traditional tech support.

While your software's publisher may not offer 24-hour, toll-free help lines, the technicians with IDEA Servcom's *PC Answer Line* are always there to help you. For $120 a year, they'll field your questions regarding 250 of the most popular programs and 700 lesser-known ones, including shareware. Armed with a comprehensive data base, they can tell you how to transfer data from *WordPerfect* to *WordStar*, or how one product interacts with another. To me, it's well worth the money.

But there's another way to get free, high-quality support after hours. Help is as close as your nearest user group. If you don't belong to one, you're missing a valuable support network—other members who are eager to help. Most user group newsletters list members offering phone support on specific products. In a recent survey of 50 newsletters, more than 40 had such listings.

Some groups go to still-greater lengths. Pasadena IBM Users Group members can search a help list on the PIBMUG BBS. Using *Skills Bank*, a commercial package scaled down to shareware for user groups, you can search by program name or general computer topic and get a list of helpers and their skills, phone numbers, and hours of availability. You can download a copy of *Skills Bank* free from the PIBMUG BBS, or run the menu-driven program while on line.

Besides your user group BBS, you can find almost unlimited help with CompuServe. I asked a technical question on a *Windows* forum on a Saturday morning, and by the end of the day, I had 25 responses—an amazing amount of help from Microsoft *plus* valuable user input. You pay a small monthly fee and an hourly charge. CompuServe is a little hard to navigate at first, but you can wander through its on-line help forever without the $6 to $22.50 hourly charge.

GREG CLARKE

Remember, getting help from vendors is a two-way street. You'll need to explain your problem and answer specific questions. Be prepared: Print a copy of your CONFIG.SYS and AUTOEXEC.BAT files and a list of new programs you've recently installed.

Sometimes you'll even be asked about keystrokes you use. When I start having trouble, I load up a little 3K TSR, *Last Resort*, to record my keystrokes so I'll have them when I call tech support. That way I can tell the technician what I've done every step of the way.

Of course, you'd never need outside assistance if the on-line help in all software were this comprehensive. At least with DOS, you can buy what you need from third-party vendors. When DOS 5.0's improved (but still inadequate) help fails me, I use *DOS Help*, a $50 program with clear, up-to-date, thorough information about anything in DOS. It can be a stand-alone, but it's really handy as a TSR when, say, I'm writing a complex batch file. I put the cursor on the word *batch*, tap the hot key, and voilà, I'm in *DOS Help*'s extensive batch tutorial.

Getting tech support used to be a hassle during nonbusiness hours. But with the right tools, it's quick, easy, and convenient—even on the weekend.

Contributing Editor Steve Bass is a family therapist and president of Pasadena IBM Users Group. He can be reached on PC World Online (see page 8 for more information).

WHERE TO BUY

CompuServe $6 to $22.50 per hour; 800/848-8199
Reader service no. 603

DOS Help $49.95; Flambeaux Software, Inc.; 818/500-0044, 818/957-0194 (fax)
Reader service no. 604

Last Resort $49.95; Working Software, Inc.; 800/229-9675, 408/423-5699 (fax)
Reader service no. 605

PC Answer Line $120; IDEA Servcom; 800/528-1400, 602/894-7446
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PIBMUG BBS; 818/332-6580
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